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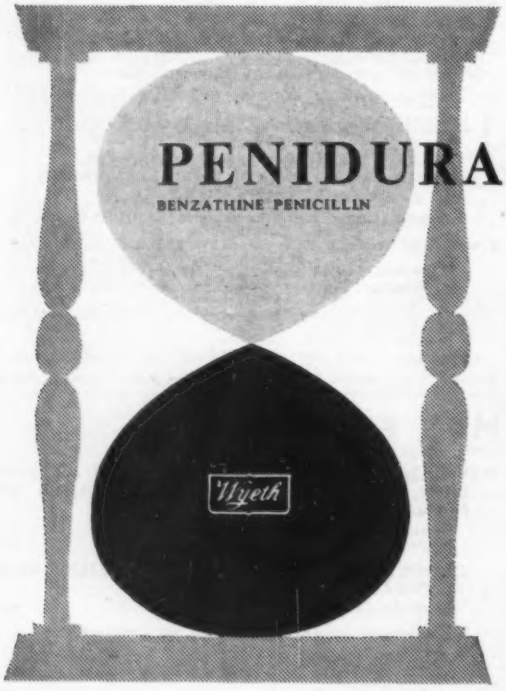

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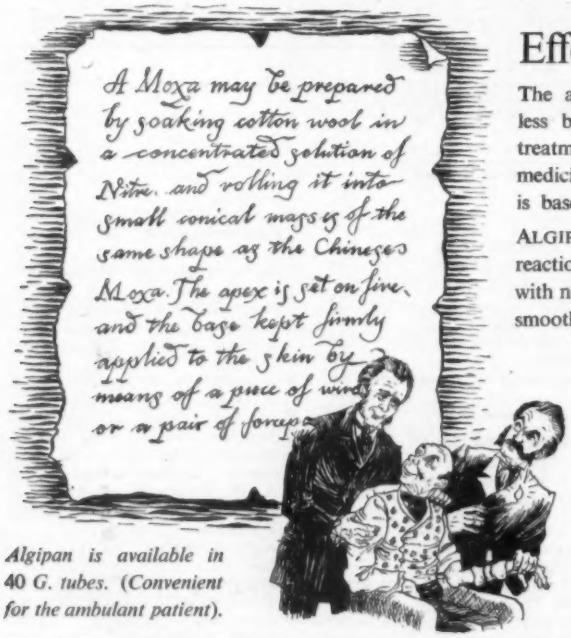
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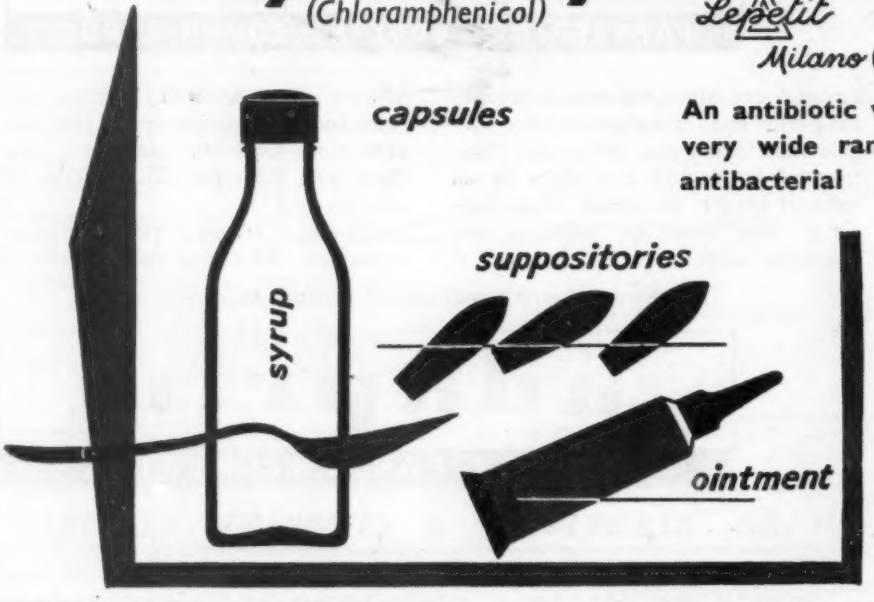

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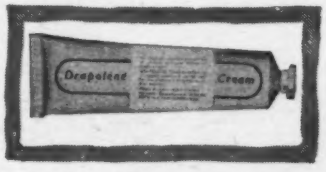

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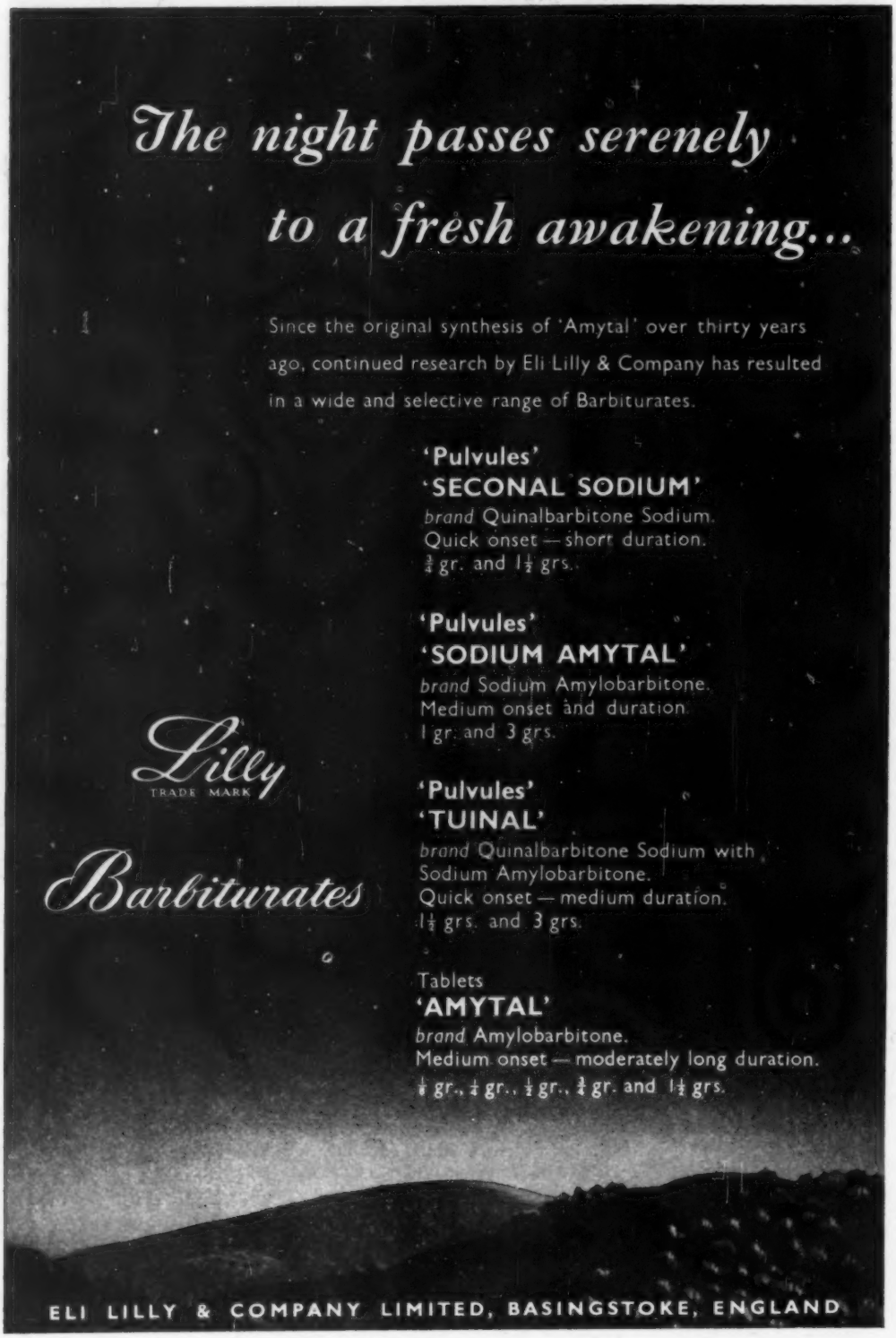
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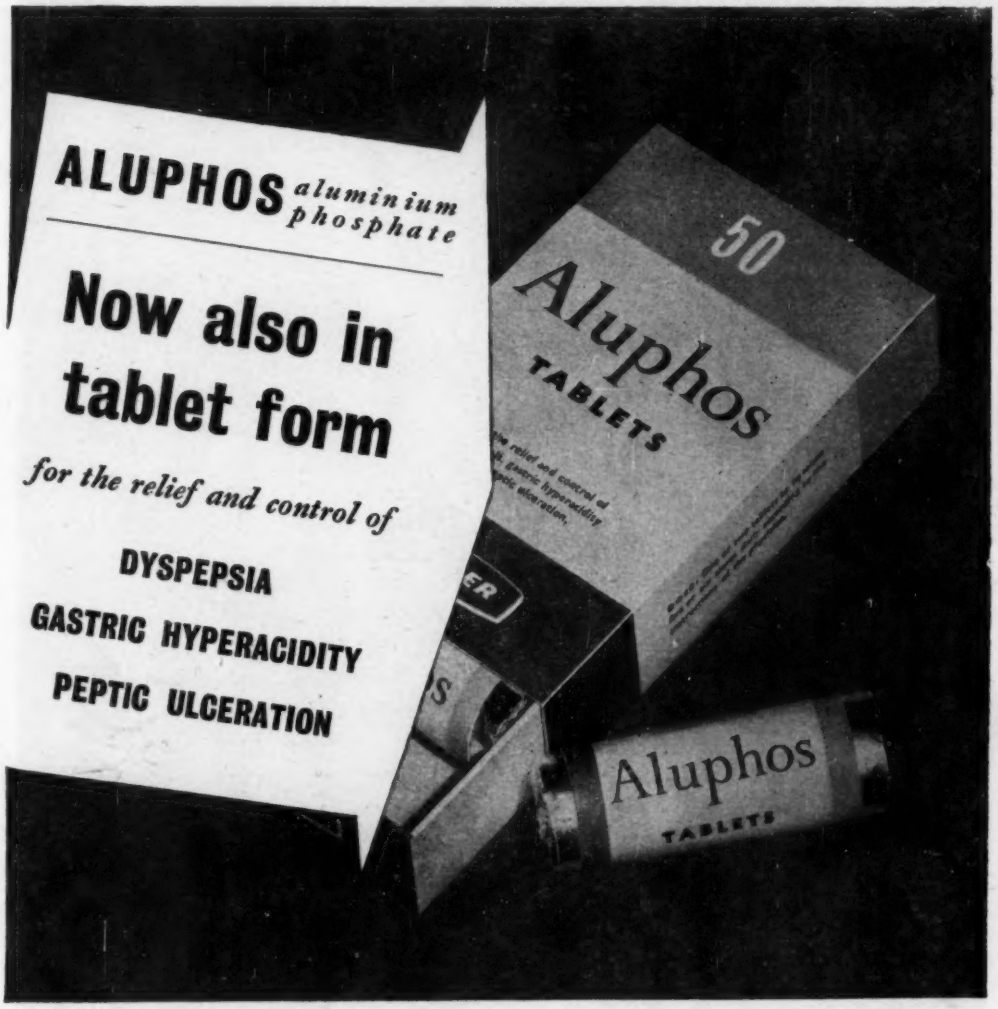

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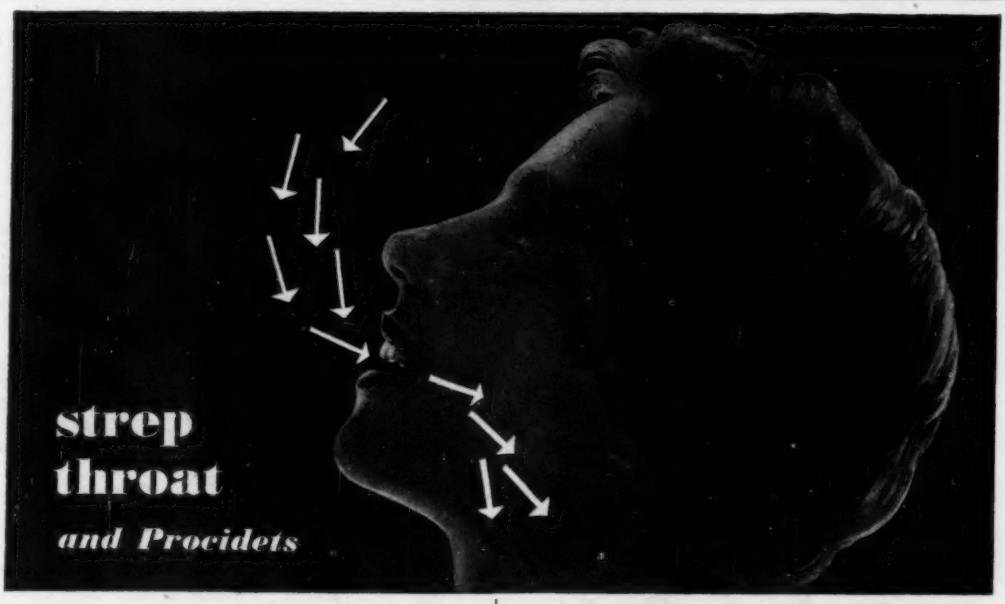

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Procidets v Penicillin

Comparative effect on ORAL BACTERIA

Before *After 1 Procidets* *After 4 Procidets*

These photographs are of representative plates showing the dramatic action of Procidets in comparison with Penicillin Lozenge B.P.

Before *After 1 Penicillin Lozenge B.P.* *After 4 Penicillin Lozenges B.P.*

Each 1 gramme lozenge contains :

Cetyl Pyridinium Chloride	*4 mg.*
Sodium Propionate B.P.C.	*100 mg.*
Benzocaine B.P.	*5 mg.*

Cartons, 18 lozenges, metal foil sealed pack.
Retail price 2/4 (incl. P./tax).
Basic N.H.S. cost 1/4 per carton.
Also available dispensing pack 498 lozenges for N.H.S. patients PROCIDETS prescribable on Form EC10. Classification category 3/4.

Procidets

Literature and samples on request

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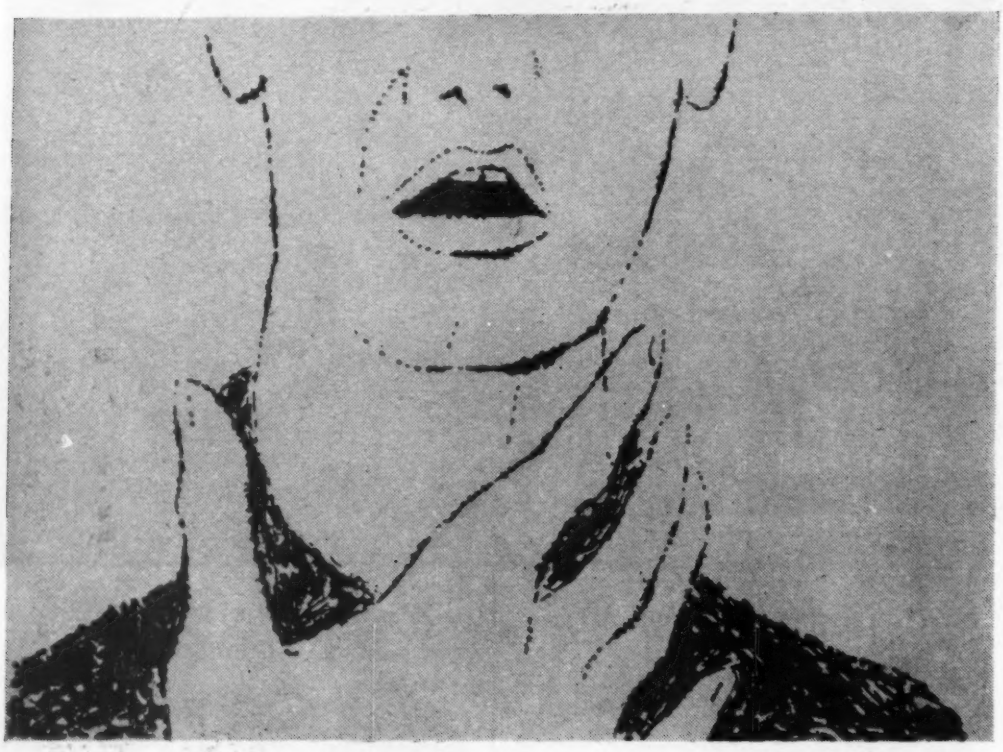


always effective

A problem with antibiotics is that resistant strains of micro-organisms tend to develop. Tyrothricin, the antibiotic in Tyrosolven, does not have this drawback.

Produced from strains of B. brevis, tyrothricin is always effective against a wide range of pathogenic bacteria — in fact no pathogenic organisms have been shown to become resistant to it.

This quality, combined with the fact that patients do not become sensitized to tyrothricin, ensures that it will remain a most effective oral antibiotic in cases of stomatitis, tonsillitis, and as a prophylactic against influenza and other throat infections.

Active principles: Tyrothricin 1 mg., benzocaine 5 mg.

Dose: One lozenge every hour till relief is obtained, then 1 lozenge every 3 hours.

Packing: Packs of 20 lozenges. Dispensing bottles of 250 lozenges supplied to chemists.

Tyrosolven

WILLIAM R. WARNER & CO. LTD · POWER ROAD · LONDON, W.4.

12

The key to successful peptic ulcer treatment

NULACIN

Nulacin effectively controls gastric acidity. The value of Nulacin in the treatment of peptic ulcer and the prevention of relapse has been confirmed by clinical studies in Great Britain, Australia, the U.S.A. and India. Nulacin tablets are palatable and convenient.

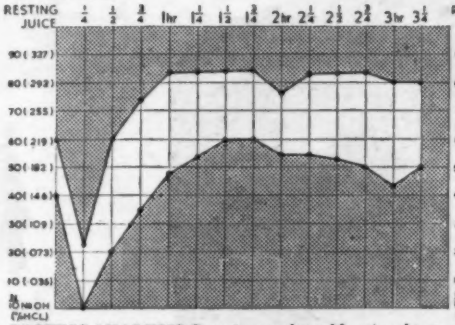
INDICATIONS

Nulacin tablets are indicated whenever neutralization of the gastric contents is required: in active and quiescent peptic ulcer, gastritis, gastric hyperacidity.

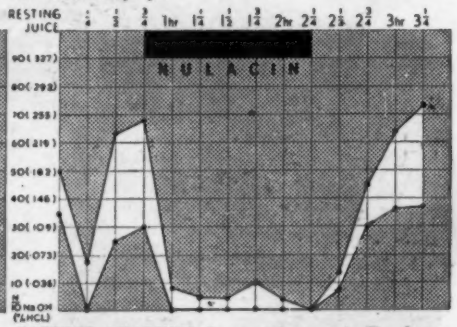
Beginning half an hour after food, a **Nulacin** tablet should be placed in the mouth and allowed to dissolve slowly. During the stage of ulcer activity, up to three tablets an hour may be required. For follow-up treatment, the suggested dosage is one or two tablets between meals.

Nulacin tablets are not advertised to the public, have no B.P. equivalent and may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to pharmacists is 2/-.) Also available in tubes of 12.

Nulacin tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium Trisilicate 3.5 grs.; Magnesium Oxide 2.0 grs.; Calcium Carbonate 2.0 grs.; Magnesium Carbonate 0.5 grs.; Ol. Menth. Pip. q.s.



GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*



GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

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Nulacin is available throughout the British Commonwealth, in the U.S.A., and many other countries. It is known as **Nulactin** in Canada and Sweden.

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Slough, Bucks.

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Epanutin & Phenobarbitone capsules containing 0.1 g. (1½ grains) Epanutin (phenytoin sodium) with 0.05 g. (¾ grain) phenobarbitone may also be usefully employed in the transition from phenobarbitone to Epanutin.

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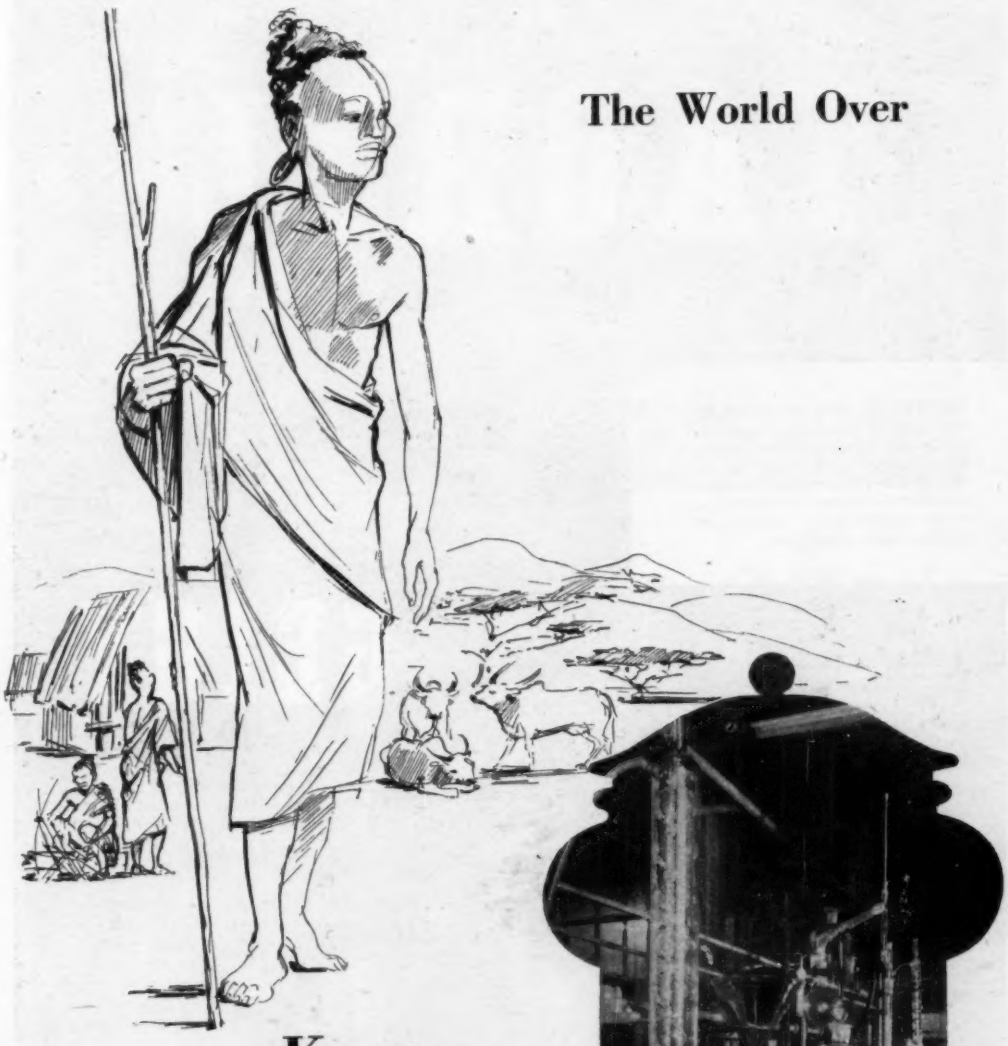

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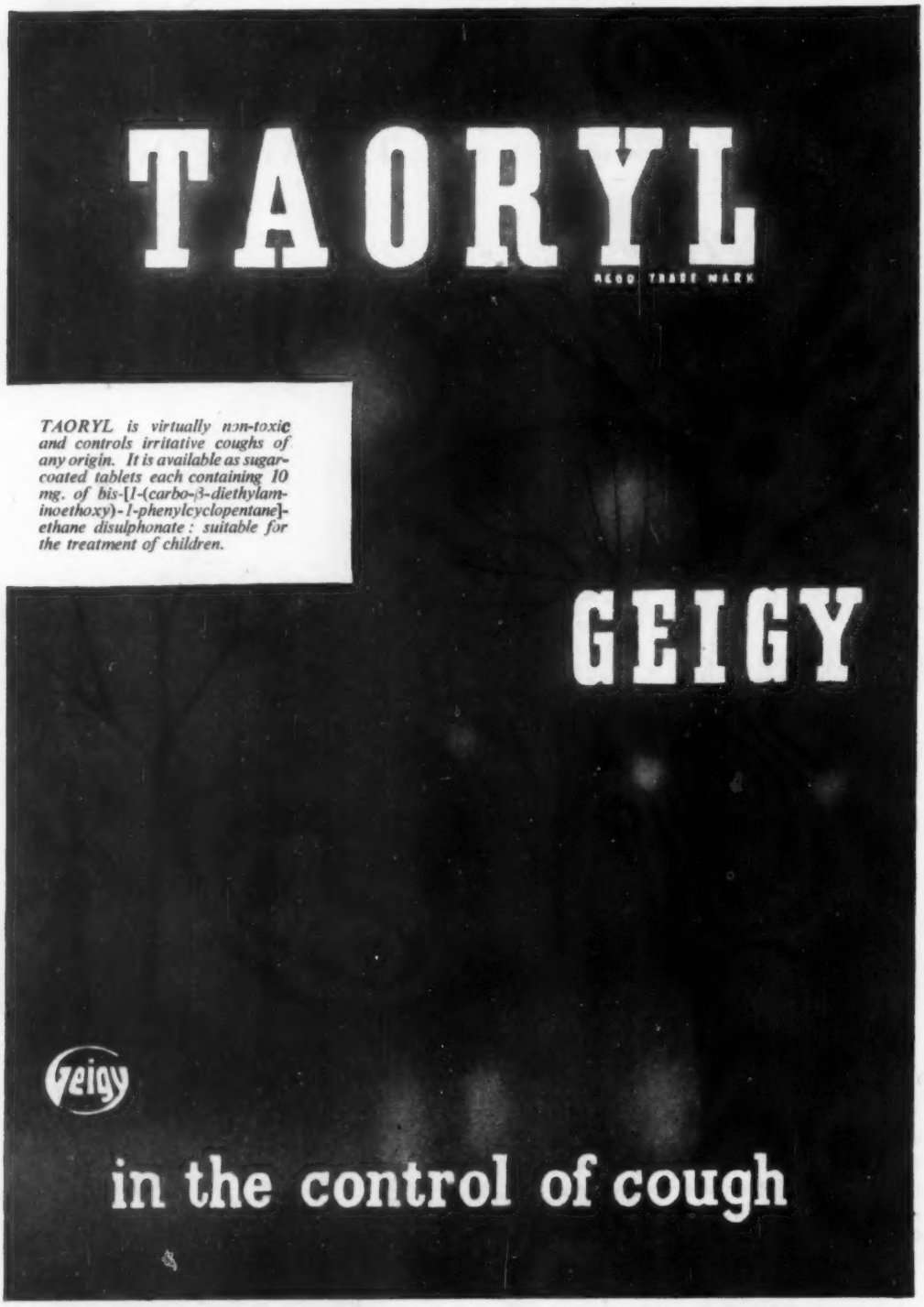
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ACETAZOLAMIDE

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***Where oral therapy is impracticable—DIAMOX** Acetazolamide Sodium Parenteral Vials of* 500 *mg.*

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M. 397

NOBECUTANE *the sterile plastic wound dressing* (*Brit. med. J.* 1954.2.17)

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A NEW FAT-STORED ŒSTROGEN

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may change present-day concepts of œstrogen therapy because:—

TACE is stored in body fat—its activity is gradually released in a manner closely resembling natural œstrogen secretion.

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INDICATIONS

1. MENOPAUSAL SYNDROME
2. INHIBITION OF LACTATION
3. PROSTATIC CARCINOMA

REFERENCES

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'TACE' is available in capsules each containing 12 mg. chlorotrianisene in bottles of 60 and 300 capsules.

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In post-haemorrhagic states; as a therapeutic or precautionary measure during and after pregnancy; in adolescents, old people and those of unsound dietary habits, Ferraplex B is ideal for iron-deficiency anaemias of all kinds.

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ASCORBIC ACID (Vitamin C) . . . . . 50 mg.
NATURAL VITAMIN B COMPLEX EXTRACT: 2 grammes *prepared from brewers' yeast and including*
Aneurine hydrochloride (Vitamin B_1) . . . 3 mg.
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Nicotinamide . . . . . 30 mg.
and all the other naturally occurring factors of the vitamin B complex.

Bottles of 50 *tablets* : 5/3*d* (*Retail*) ; 250 *tablets* 15/6*d* (*Basic N.H.S. price*).

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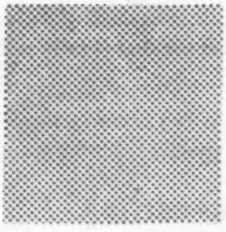

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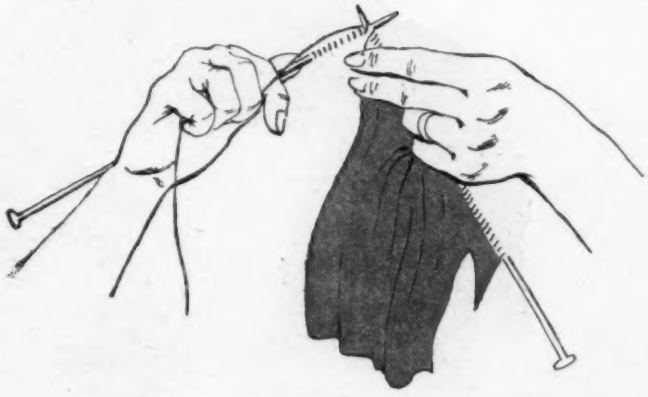

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1. 1 fl. dr.—3.5 ml.

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Sodium 2:6 ditertiarybutylnaphthalene monosulphonate (Becantyl), a product of original research, is a new agent that is specific in suppressing cough. It is unrelated to morphine and guaiacol.

BECANTYL does not cause constipation, anorexia, drowsiness or any other undesirable side-effects; being devoid of side-effects, **BECANTYL** may be prescribed for children and the aged.

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BECANTYL is presented in 4 fluid ounce, 40 fluid ounce, and 80 fluid ounce bottles.

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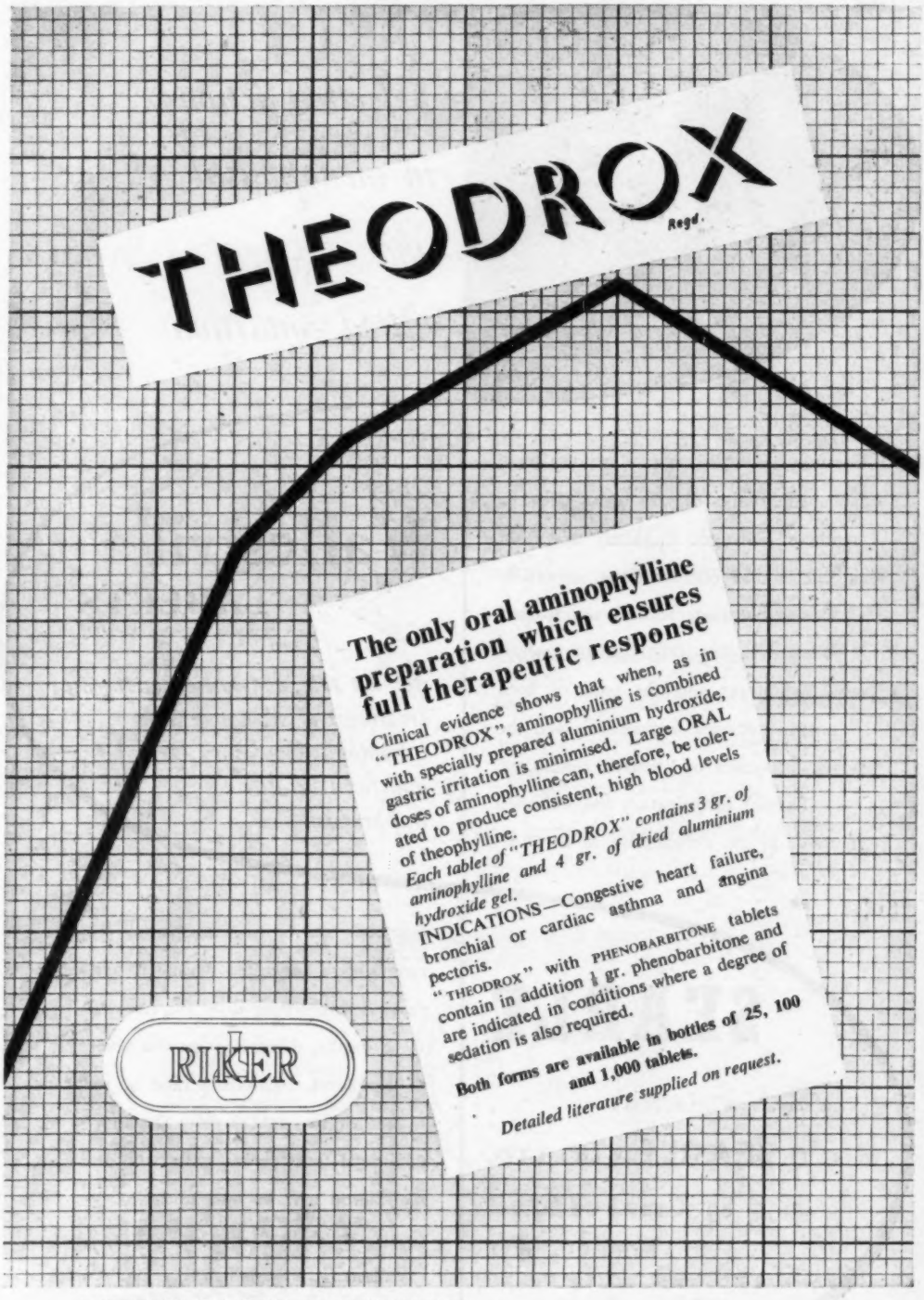
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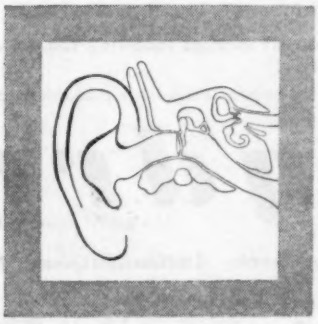

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It is a valuable alternative in cases resistant to other drugs;

Trials indicate that it can enable a higher percentage of cases to lead a more mentally alert, normal and balanced life;

Improvement in personality traits and well being have been markedly evident following the use of the drug.

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N - Benzyl - beta - chloropropionamide

New Synthetic Anticonvulsant for Grand Mal

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PLEXONAL

The combination of dihydroergotamine and hyoscine with sub-threshold doses of three barbiturates offers a new means of inducing sleep and general sedation without provoking side-effects or hypnotic "hangover".

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Each tablet of Plexonal contains:

Dihydroergotamine methanesulphonate	0·16 mg
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Sodium isobutyl allylbarbiturate	25·0 mg.

Dosage

One to three tablets as required

Packages

Tubes of 20 and 200 tablets.

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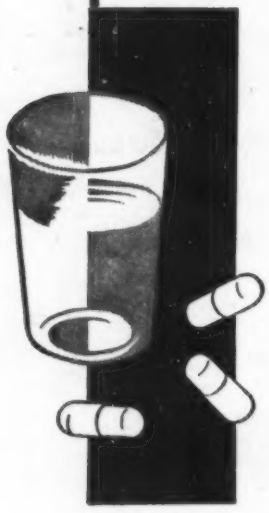
A new standard of efficacy

PENICILLIN-V, LILLY

COMPLETELY NEW ORAL PENICILLIN



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It is therapeutically comparable with parenteral penicillin ; high dosage is unnecessary.

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King John

The "cold comfort" of our day is 'Vasylox', which rapidly relieves nasal congestion in the common cold, hay fever and similar complaints. Gentle, prompt and lasting in action, it does not stimulate the central nervous system. It is pleasant to use and so safe that children and infants may use it. 'Vasylox' is issued in bottles of ½ fl. oz., each with a separate dropper.

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FOR MILD FORMS OF PAIN

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ORTHODOXY AND HETERODOXY II*

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A QUARTER of a century ago I was invited to Chichester to read a paper on Orthodoxy and Heterodoxy in Surgery. This was the first time that I had been asked to speak to a medical society. It was the first time I had attempted to tackle an essay type of subject, and in this sense the invitation was a decisive event in my career. Now I come again after twenty-five years to the same city to speak to the same society on the same subject. My talk must therefore fall into two sections: first, a re-examination of my previous views on orthodoxy in the light of greater experience; and secondly a review of the verdict of history on the orthodoxies and heterodoxies of those far-off days.

Virtues of Orthodoxy

I pointed out then that a fundamental problem in all institutions is how to combine security with progress, tradition with discovery. Security without progress means stagnation and decay; progress without security leads to anarchy and ruin.

Orthodoxy means the holding of right or accepted views in matters of public interest. The personal affairs of an individual are his own concern; but in matters affecting the many, a general standard of orthodoxy is necessary, indeed inevitable, from which standard any departures are judged. Orthodoxy is the sifted and codified view of the majority. When we say that a thing is orthodox, we mean that it is the belief of the majority, but not necessarily that we agree with it.

Orthodoxy therefore represents the wisdom and learning of the past, and it provides the security of that wisdom. An orthodox novelist, scientist, or doctor can be trusted to have as much learning as the last generation of his craft. That may seem a small commendation, but it is in fact one of fundamental importance, because where there is no body of orthodoxy there is no assurance to the public that the specialist in any branch of learning knows anything at all. A man may set himself up as a surgeon, a preacher, an engineer, or an architect without knowing as much of these arts as an African witch-doctor.

This is the value, in surgery, of orthodoxy, and of the machinery of examinations, degrees, and corporations that upholds it. It ensures that the surgeon does, at any rate, know something of his job. The public has no assurance other than the label provided by the degree—a degree granted by a committee of the orthodox for a knowledge of orthodox practice—that they are entrusting their lives to someone who is not an ignoramus. Without such a guarantee the sick man is indeed in a quandary. One friend tells him to go to So-and-so, another to someone else, and he has no better reason than their opinion to guide him in his choice. He has no better reason, for nothing better exists. He has no expert knowledge himself to enable him to judge between the claims of rival hucksters, and, in the absence of orthodoxy, he would not even know where to acquire that knowledge. He is likely to be swindled by teachers as ignorant as himself. This is no fanciful picture. This was the lot of the sick man throughout the world not many years ago. It is the lot of the sick in many parts of the world today. It is the lot even in this country of people who, when they are sick, spurn orthodoxy because they know better.

Orthodoxy then is the essential basis of civilisation, and the real difficulty is to prevent orthodoxy passing into stagnation, to devise machinery for discarding theories that have ceased to accord with modern views, and practices that have ceased to have value; in short, for ensuring that the heterodox is heard, tested, and, if approved, admitted to the body of the orthodox.

Authority and Inquiry

The more ancient and stable is a civilisation, the more securely does orthodoxy become enthroned, because the more certainly does authority pass into the hands of the elderly. The elderly, who have experienced life's troubles and sifted life's problems, and arrived in the end at an explanation that satisfies them and a modus operandi that works, are usually sure that their conclusions are the right ones, and that any new ideas presented to them are a revival in different guise of the doubts and questionings that disturbed them when they were young. The teachings of medicine have always tended to be authoritative. The word of Galen was law for more than a thousand years, and any attempt even to question his pronouncements was looked on as dangerous ignorance. The Renaissance brought a new spirit of inquiry, but resistance to the new remained. Darwin's teachings, humbly though they were propounded, were opposed not merely by the Church but by most scientists. Lister's views on the causation of sepsis were scoffed at and his treatment was opposed by the majority of surgeons, and only at Guy's were they received immediately and enthusiastically. Like many revolutionaries, Lister in turn became a pillar of the new orthodoxy he had created, and an opponent of the aseptic surgery that his followers were shaping.

When I spoke in 1930, I was speaking, though I did not know it, in terms of a phase of the world's history that was even then passing away. I spoke of "art made tongue-tied by authority, and folly doctor-like controlling skill," and of the need to fight for freedom. The rule of authority received its death blow in the first world war, and was even then passing away, at any rate in all countries outside the Iron Curtain. Now we have the reverse outlook. In place of "look before you leap" we have the maxim "try anything once." In place of the man of learning we worship the revolutionary. We have displaced the Apollo Belvedere from our art galleries, and put in his place a wire puzzle dedicated to the Unknown Political Prisoner.

The spirit of inquiry is admirable if it is really inquiry and not uncritical novelty worship. It is right that we should examine and consider every new thing that is presented to us, but not necessarily right that we should adopt it. Most new things turn out in the end to be wrong. When presented with a new project for acceptance, we should first ask: "Is it reasonable?" Then, "Is it really new? Has it, or anything like it, been tried before? If so, has it failed, and why? Was the failure due to some inherent defect, or to some circumstances that can now be remedied? If it is reasonable but yet untried, can it be tried without risk? If there is a risk, how can that risk be eliminated or minimised? Are we justified in a full-scale trial, or should we first try a pilot experiment? Can the experiment be done first on ourselves?"

Experimentation with the lives of others is as tempting to the rash surgeon as experimentation with the property of others is to the rash politician. In each case success means personal credit, failure means a loss to someone else. The worst examples of rash enterprise are seen in politics, for the politician must fire off all his rockets before the next election and he seldom has the time for careful consideration or for pilot experiments. There has been in surgery no example of foolish enterprise and blindfold experiment comparable to the Ground Nut Scheme in East Africa. The idea was magnificent, but

* Read before the Chichester and District Hospitals Clinical Society on Oct. 12, 1955.

inquiry among those who had spent their lives farming in that part of the world would have shown that it was impracticable. A pilot experiment on a dozen acres would have demonstrated its futility at a cost of a few hundred pounds. But the idea was so grand that such precautions were swept aside. Hundreds of thousands of acres were cleared of their natural vegetation by bull-dozers, unsuited to the terrain or the climate. Hundreds of wild creatures, whose forebears had peopled those plains since the Creation, were slaughtered by machine-guns fired from jeeps. Nuts were planted but no nuts grew. The politician, unabashed, passed on to some fresh enterprise. The public had to pay a bill of £40 million.

Disasters of this magnitude are not often seen in surgery, but enterprises just as rash, undertaken with as little preliminary study and in ignorance as complete of the failures of the past, are continually being perpetrated. The National Health Service Act abolished the conception of the apprentice or the beginner. In 1948 the Minister told the country that henceforth everybody could get treatment by a specialist. This was another way of saying that henceforth everybody would be called a specialist, and not merely a specialist but a consultant, one fit to be consulted. In this brave new world the surgical trainee, if he is fortunate, is summoned one day to a board meeting as a registrar, and leaves it ten minutes later as a consultant. Having treated his wife to the best dinner he can buy, and treated himself to a better car than he can afford, he proceeds without delay to invent some new operations. He may not be very clever, and he may not have studied very deeply, but he can hardly fail to think out a new operation or a modification of an old one.

New Operations

Surgical heterodoxy is rife in operations on the stomach, for peptic ulceration is a very common disease, becoming commoner every year, and the claptrap and sales-talk of animal experimentation can be had for the asking, and can be served up to support any theory, however bizarre, and any operation, however unsound. Dozens of new operations have been propounded in the past few years by young men who have not yet shed their surgical milk-teeth. Some of them break all the canons of gastric physiology, repeat the errors of former failures, and have proved disastrous almost from the outset. But all of them have been publicised as epoch-making advances, and few of them have been apologised for. The failures are not known widely enough to prevent newcomers who have read the original articles trying the same thing again.

Temporary Orthodoxy

A difficulty is here apparent, that of deciding the length of the trial period. Many gastric operations, unsound though they may be, are not immediate failures, for the stomach is a very viable organ, and any diversion of the gastric contents to a new channel will cause the original ulcer to heal and give temporary relief. They are heterodox, and they never achieve sufficient longevity, or the respectability that the years impart, to become orthodox; others give sufficiently good results for a sufficient time to achieve temporary orthodoxy, for orthodoxy is an ad-hoc grading, signifying approval for the time being. When they fail, or are found out (which usually happens a good deal later), they are dropped.

An operation that has remained so long in the orthodox category as to seem a permanent "ortho" is gastro-jejunostomy. Introduced some sixty years ago for the relief of cancer of the pylorus, it was so successful in the treatment of duodenal ulcer with pyloric stenosis that it became accepted as the standard operation for all duodenal ulcers requiring surgery. It remained unchallenged for twenty years and was looked on as almost above criticism by Moynihan till he died and by Balfour till he retired. In my previous lecture I cited gastro-jejunostomy as an eminently respectable and satisfactory example of orthodox surgery. Yet about that time the unsatisfactory results of the short-circuit operation, as it was then known, were starting to accumulate. Five years later, in 1935, I said at Oxford: "Gastrojejunostomy must go. It will survive, like some of the amputations in the foot, a technical exercise in operative surgery classes and a useful expedient in the occasional case. But it cannot remain in the group of rational and successful operations." More and more surgeons have come to agree with this view, and of those who have extensive experience of gastric surgery very few would do the operation today. Yet gastrojejunostomy retains its place among the orthodox procedures by its simplicity, its technical perfection, its immediate success, and by its freedom from sequelæ, in many cases for a few years, in some for life. For the unskilled surgeon on the unfit patient it has much to recommend it.

In discussing what we mean by orthodoxy, this question of ad-hoc grading is important. Orthodoxy implies preference, the preference of others, but not certainty. When we have no doubt that a thing is right, when there are no alternatives, we call it right, accepted, correct, or true, but not orthodox. Grading changes with the years. In transportation a rubber tyre with a pneumatic inner tube was first experimental, then heterodox, then orthodox, then it was accepted as correct for at least fifty years. Now, with the advent of the tubeless tyre a tubed tyre is once more orthodox. With improved methods of suspension it may again become heterodox, and finally obsolete. What has happened to the surgical heterodoxies and orthodoxies of twenty-five years ago?

Advances Since 1930

I have looked through the books claiming to discuss recent surgical advances—a group that we might equally well call heterodoxies. One of these is the second edition of my own book on *Recent Advances in Surgery*, another is the *Medical Annual* for 1930, a third is Evarts Graham's *Surgical Year Book* of the same year.

The first thing that strikes one is the number of methods or procedures, now standard practice, that were then unknown. There is no mention of the sulphonamides, of antibiotics, of intravenous therapy, or of gastric suction. Blood-transfusion was a useful expedient deserving small print only. Heart surgery was limited to the repair of stab wounds, and operations for adherent pericardium. The surgery of the pancreas concerned acute pancreatitis only. Arterial and portal hypertension, and prolapse of the intervertebral disc had not yet made their appearance. There was no pinning of femoral necks, and the operative treatment of fractures was "not done."

It is difficult to think of all the battles that have been won and lost, the empires that have risen and crumbled in those twenty-five years. 'Prontosil' came into use in 1935, and by the outbreak of the war in September, 1939, a number of new sulphonamides—notably sulphapyridine, sulphadiazine, sulphathiazole, and sulphaguanidine—had been introduced. In the fighting in Africa the sulphonamides showed their power to hold infection in check and to allow serious casualties, notably cranial wounds, to be transported to specialist centres for planned operations some days later. Penicillin came in 1943, and in its train came a host of fresh antibiotics offering protection against an increasing number of bacterial strains, but none of them as safe as penicillin. The antibiotic honeymoon reached its climax about 1950, and the many disadvantages and dangers of this form of therapy—the toxic reactions, the sensitisation, the emergence of resistant strains of the well-known pathogens (particularly the staphylococcus), and the

development of invasive characters in yeast and harmless saprophytes when freed from their rivals—these problems are now engaging attention. There is no doubt that the use of the " antibiotic umbrella " will remain an orthodox part of major planned surgery, but I foresee a return of the sulphonamides to favour for simple protection.

Continuous intravenous medication, and gastric suction, were both introduced in the late '20s, but they did not come into general use in surgical practice until the '30s. It is difficult to think of an advance more important, for these two devices have enabled surgeons to do what they could never do before, to keep a patient not merely alive but in fluid and salt balance while his alimentary canal is completely rested. The improvement that has resulted in the recovery figures in peritonitis, intestinal obstruction, and in all major abdominal surgery is now accepted as a matter of course.

In 1930 heart wounds were sutured, and a few surgeons, greatly daring, resected portions of the pericardium; but cardiac surgery, as we understand it today, was unknown and thoracic surgery was just beginning. The *Surgical Year Book* of 1930 devotes some pages to surgery of the lung, but it was edited by Evarts Graham who was the father of pulmonary surgery, and the first man to resect a lobe for cancer of the bronchus. Lung surgery in those days meant resection of a lobe whose vessels were controlled by a string tourniquet. Deliberate dissection in the opened thorax, and the whole of restorative surgery of the heart, had to wait for the development of controlled respiration anæsthesia some five years later.

Disappointments Since 1930

The events I have described have been the development and establishment as major surgical enterprises of methods that were unknown when I spoke in Chichester twenty-five years ago. In the same period there have been many lesser stirrings in the surgical world, new ideas, and new methods, that have risen to temporary orthodoxy and once again sunk back.

When I first visited America in 1937, I landed at Boston, and within a few hours I was watching an operation for prolapsed intervertebral disc. I had never heard of such a condition, or seen such an operation before, but I saw three more in the next two days and several dozen before I returned to England. I went back with the feeling that it was very unsafe at that time to admit to having a backache or sciatica. When I returned to America the next year the centre of interest had shifted to arterial hypertension. Surgeons were now vying with each other to relieve the sufferers from this disability, and each had his own operation. Heuer in New York was dividing the posterior spinal roots, Peet at Ann Arbor was removing the last two dorsal and the first lumbar ganglia by an extrapleural approach, Adson at the Mayo Clinic was excising the splanchnic nerves and large parts of the cœliac ganglia through a lumbar incision, Crile at Cleveland was shelling out the semilunar ganglia by a blind operation. It was even more unsafe to admit to a headache then than it had been to complain of backache the year before.

These two lesions, disc protrusion and hypertension, illustrate the excessive optimism with which surgery is apt to approach a new problem, and the difficulty of deciding, before the excitement has run its course, before the tumult and the shouting have died, where the line between orthodoxy and heterodoxy will eventually be drawn. In each case the discovery of a lesion was accepted as an indication for operation; in each case enthusiastic reports of results obtained by operations differing widely in their purpose and their scope were reported; in each case disillusionment came, not from frank analysis of their results by surgeons, but from a growing disappointment on the part of physicians and patients. Surgery is not dead in either case, but it is reserved for special indications on the advice of a physician rather than a surgeon.

The advice one disc sufferer would give to another today is: " Whatever you do, keep away from surgeons." Sciatica is nearly always due to disc protrusion; yet before discs were invented, sciaticas all got well eventually, and now the great majority get well with rest and remain relieved while they wear a belt. Operation is necessary in the uncommon case of definite root pain that cannot be relieved; but while removal of the disc will relieve the root pain, it often makes the backache worse.

In the case of hypertension, the indications for operation are intolerable headache and failing vision that cannot be relieved by hypotensive drugs. In such a group the operation has a high mortality due to cardiac or cerebral complications, it does not lower the blood-pressure much, and it does not prolong life appreciably, but it does make what remains more tolerable.

Portal hypertension has been taken under surgical patronage even more recently, and short-circuits between the portal and the systemic venous systems are the present pastime of professors. Portal surgery is all the rage, and he would be a bold man who would deny to portocaval anastomosis a place among the orthodox operations. Nevertheless I will be so bold. I believe that the only place for operation is in the treatment of repeated hæmorrhage from œsophageal varices—and that calls for a direct attack on the varices.

Another newcomer to surgery in the period I am reviewing, one whose present place is very different from that first allotted to it, is the operation of radical pancreatectomy. Whipple did the first successful operation in 1935. Others, mostly Americans, followed suit, and Cattell of the Lahey Clinic some years ago published a series of more than a hundred with a very low operative mortality. The low survival-rate, however, has brought the operation into discredit. The pancreas has no capsule, and by the time a cancer has become clinically apparent, malignant cells have usually reached the areolar planes around the aorta and inferior vena cava. The consensus of surgical opinion today is that in cancer of the head or the body a simple short-circuiting operation will, on the average, give a longer survival. In cancer of the ampulla, however, symptoms, signs, and radiological appearances allow early diagnosis, and the results of radical surgery are excellent.

Matters of Opinion

In deciding to talk once again on this subject, I realised that I was taking on a difficult task. I did not realise till now, when I have had my say, that it was an impossible one. I have attempted to define what we mean by orthodoxy. That is a fairly simple matter. But in attempting to define what we mean by orthodoxy in surgery, I realise that I have missed the point entirely. I have spoken of procedures that were once heterodox and that are now orthodox, and of procedures that were once orthodox and are now discarded. But I realise that throughout I have simply used the word " orthodox " as a synonym for " good "—indeed for " good in the view of a limited circle." There can be no finality about good in surgery, for the good is always changing, and what is good today here and now, is not necessarily good in another patient, in another country at a different time or in the hands of another surgeon. Further, in a subject so fluid and so dependent on conditions and circumstances, good is after all a matter of opinion. A thing becomes orthodox only when it is considered good by the majority, and when a surgical procedure has been heard of by the majority, tested by the majority, and approved by the majority, it is certainly out of date, and probably wrong. When I am asked by a registrar to suggest a subject for a thesis, or one on which he can conduct research, I say:

"Look around for some subject on which we are all agreed, and start thinking for yourself. You will find you are on virgin ground."

As far as I am concerned, when I have talked about the orthodox, I have in fact meant little more than the views I hold myself. Let me apply the acid test. What did I consider orthodox and heterodox twenty-five years ago?

I described an operation I had invented myself for the treatment of right-sided abdominal failure—right hemicolectomy, with transplantation of the ileocæcal sphincter, carrying its nerve and blood-supply, into the transverse colon. I was very pleased with this operation then. The fashionable London surgeon of the day approved of it, and did fifty in the next six months. I have never done it again, and I have, like most surgeons, steered entirely clear of the right-sided abdominal failures. Those that are fortunate enough to escape the underworld of surgery who still make a living out of pexy operations, now go to the psychiatrists or to Christian Science, which is much the same thing. Yet in the *Medical Annual* of 1930 I find that one surgeon reports one hundred and fifty nephropexies, and many surgeons advocate colopexy. My operation was very much better.

In the surgery of peptic ulceration I praised gastrojejunostomy and I criticised the Billroth-I operation. Today I could not agree less. Though I still love doing a gastrojejunostomy, I ceased to regard it as a rational procedure twenty years ago. I doubt if I have done half a dozen since the war. On the other hand, I regard the Billroth-I gastrectomy as one of the best operations in surgery when the duodenum is normal (that is, in gastric ulcer), and one of the worst operations in surgery when the duodenum is scarred (that is, when done for duodenal ulcer).

I criticised the Billroth-I twenty-five years ago, on the following grounds:

"The pyloric end of the stomach and first part of the duodenum are poor surgical material, thick, friable, and vascular; they must be mobilised for approximation, and are pulled from their natural line and under tension after suture; they are not readily controlled by clamps. When an anastomosis is made between them bleeding is troublesome at the time, leakage is not uncommon afterwards, and the finished operation is seldom a really satisfactory craftsman's job."

Those were the criticisms by a young surgeon of a technique he had not yet mastered. The gastroduodenal anastomosis can be done with complete safety, and is a perfect craftsman's job if the material is good. A stoma, like a sphincter, should be perfectly mobile. It should be free to move with the movements of peristalsis, or with the displacement of its component parts or of its neighbours. When the resection has been done for duodenal ulcer the stoma is not mobile, for the distal component is tethered by its fusion with the head of the pancreas and by the entry of the common bile-duct.

To one who takes the long view—and I am sorry to say that I am now able to do that—the Billroth-I operation is following today the path that gastrojejunostomy followed in 1920. The operation gives such excellent results when it is done for the proper indications that it is being applied wholesale to cases for which it is entirely unsuitable. The bad results are already accumulating, but they are as yet known only to the few, for no surgeon ever reports bad results, certainly not his own. When they are known sufficiently widely, I fear that the Billroth-I operation may be condemned as gastrectomy is condemned in some quarters today—not because it is a bad operation, but because it is done badly.

Pause and Progression

For my peroration, I must once again quote my former Chichester talk:

"A barge making its way up the Thames from London to Oxford does not proceed at a uniform rate. At times it is moving forward; at times it remains stationary in a lock; but while it is in the lock, water is flowing in from the higher streams, till finally a new level is reached and a fresh advance is possible. Thus, by alternate pause and progression, it finally mounts to the highest levels. So the advance of knowledge must be wayward: the locks are periods of orthodoxy; the advances, of heterodoxy."

I wish that I could be as certain today of the inevitability of advance. It appears too often that a surgical advance is like a wave rather than a river, a change of form in which there is little true forward motion. The wave rises from the expanse of water, it mounts, for a brief period it towers above its surroundings, then at last it collapses in a welter of foam. We must watch the waves of knowledge. We must try to keep on the rise and avoid the backwash.

EFFECT OF CHLORPROMAZINE ON CONVULSIONS OF EXPERIMENTAL AND CLINICAL TETANUS

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THE treatment of tetanus convulsions is attracting much attention. There are two principal methods: the use of sedatives and mephenesin, and the use of neuromuscular-blocking agents with light anæsthesia. The ability of anæsthetists to keep patients completely paralysed yet alive for long periods has been amply demonstrated; but treatment by paralysis, quite apart from other disadvantages, must be impracticable in any country where tetanus is common and skilled anæsthetists are few, and a simpler alternative must be sought.

There is need for a drug or combination of drugs which will abolish the muscle spasm without affecting respiration or abolishing consciousness. Mephenesin has some of the qualities of such a drug, but it has serious clinical disadvantages including apparent inability to control the most severe cases. The readiness with which physicians have invited anæsthetists to paralyse their patients is a sufficient indication that mephenesin is thought to be inadequate or dangerous.

With this need in mind, one of us examined the effect of both old and new drugs on experimental tetanus in the hope of finding a substance more effective than mephenesin. So far the only drugs of any promise are chlorpromazine and promethazine, which have similar chemical constitutions.

Technique

Rabbits were given an intramuscular injection of tetanus toxin into one hindleg, the dose being adjusted to cause pronounced resting tetanus in the injected leg, the other being minimally affected or unaffected and so acting as a control. Electromyographic records were taken from both hindlegs of the conscious animal, which was supported in a canvas sling. Drugs being tested were injected intravenously and their effect on the tetanus spasm observed. This technique is based on that described by Wright et al. (1952).

A standard afferent stimulus, consisting in dropping a weight on to the metal frame supporting the rabbit sling, was used to give a rough measure of the completeness of abolition of the tetanus.

Results

Chlorpromazine 1 mg. per kg. body-weight intravenously abolished "spontaneous" tetanus (i.e., no intended afferent stimuli applied) and reflex tetanus for 77 min. (mean of 7 experiments). The minimum time was 27 min., and the maximum 120 min. During this time the animal did not respond with muscle spasm to the standard afferent stimulus, which before the drug was given produced a pronounced increase in spasm (fig. 1). If no afferent stimulus was applied the tetanus was abolished for periods up to twice as long. Larger doses of chlorpromazine abolished reflex tetanus for up to 4 hours.

The animals were quiescent after chlorpromazine 1 mg. per kg. body-weight; but normal rabbits given this dose would hop about if encouraged. Respiration was unaffected.

Control injections of saline did not reduce the tetanus.

Promethazine also abolished tetanus, but only in high dosage (4 mg. per kg. body-weight) and for a shorter time (less than 1 hour).

With these results in mind it was felt justifiable to attempt to control human tetanus convulsions with chlorpromazine alone; for spontaneous respiration and retained consciousness might be of very great advantage, whereas unconsciousness, with or without neuromuscular block, prolonged for many days and possibly even weeks, could not but influence the patient unfavourably.

Case-report

A boy, aged 2½ years, crushed the tip of a finger in a door on Aug. 25, 1955, and was taken to hospital. No tetanus antitoxin was given. He was later transferred to the plastic unit at Mount Vernon Hospital, where he underwent a repair operation on the same day.

On Sept. 6 his mother noticed that he could not open his mouth, and on Sept. 9 he was readmitted to Mount Vernon Hospital with generalised tetanus convulsions. He had

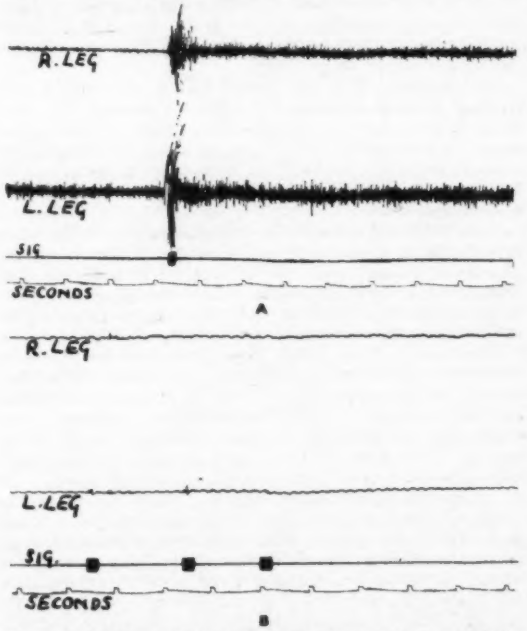

Fig. 1—Electromyographs from gastrocnemius region of each hindleg of rabbit after injection of tetanus toxin into left gastrocnemius: A, severe resting tetanus on left and minimal tetanus on right, with subsequent gross tetanus in both legs, after application of standard afferent stimulus at signal; B, after chlorpromazine 1 mg. per kg. intravenously there is no resting tetanus and three standard afferent stimuli have no effect.

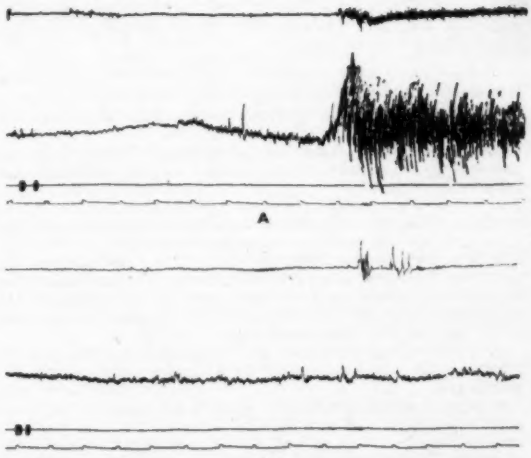

Fig. 2—Electromyographs from case of tetanus (surface electrodes). Tracings from above down represent: electrical activity of anterior tibial muscles; electrical activity of calf muscles; signal; seconds. A, at the signal an oxygen tube was passed up the nose, resulting in vigorous spasm of both groups of muscles; B, after chlorpromazine the same manœuvre produced no response.

The records are not accurately quantitative. There is considerable electrode artefact in all tracings, as care was taken to disturb the patient as little as possible in placing the electrodes.

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continuous trismus and frequent series of opisthotonic spasms, although if undisturbed he would sleep fretfully for periods of 10 minutes without spasm. After about 5 hours' observation in this state he was given 15 mg. (approximately 1 mg. per kg. body-weight) chlorpromazine intravenously, and within 10 minutes had fallen into a sound sleep with his mouth relaxed for the first time for 3 days. 30 minutes later his wet sheets were changed without provoking a spasm, and only one severe spasm occurred in the next 3 hours. It was decided to continue with chlorpromazine alone and to increase the dose if necessary. An intravenous drip was maintained, and into this, every 2–5 hours, doses of chlorpromazine were given according to the severity of the convulsions.

The aim was to control the convulsions at a level at which they did not exhaust the child unduly, rather than to achieve complete relaxation (fig. 2). That chlorpromazine was effective against the convulsions was demonstrated by their regular cessation or mitigation 20–30 minutes after a dose and their regular recrudescence some time later. On three occasions the tetanus became completely out of control, and prolonged and almost continuous severe spasms occurred for 4–6 hours. On each occasion it was suspected that the intravenous infusion was not flowing freely, the limb having become grossly œdematous, and on each occasion control was rapidly re-established by an injection of chlorpromazine directly into a fresh vein. It was noticed that these occasions each followed a reduction of dosage during the previous night and that a larger dose was required to re-establish control than was needed to maintain control once this was achieved. The maximum single dose of chlorpromazine was 40 mg. These three occasions also coincided with some extra stimulation—e.g., a lawnmower working outside the window, or extensive mouth toilet. Apart from these occasions the degree of control varied, but opisthotonic spasms occurred no more than three or four times in a day and minor spasms lasting less than 15 seconds ten to fifteen times a day. These spasms usually occurred at nursing times when vigorous afferent stimuli were unavoidable, or 2–4 hours after a dose of chlorpromazine. More than half the nursing care, which was applied 30 minutes after a dose, was carried out without provoking severe spasms.

At no time was consciousness lost as a result of administering the drug. The child was always easily rousable from sleep. Respiration was unaffected. Phenobarbitone was given to control restlessness as the chlorpromazine was withdrawn. Chlorpromazine was given for 16 days, the total daily dose

(mg. per day) being 75, 180, 220, 200, 155, 225, 285, 275, 330, 250, 215, 300, 240, 115, 50, 30. The child had a slow but uneventful convalescence.

We are not here concerned with general aspects of treatment, but the following features are important:

1. The child was fed by stomach-tube from the first. He never vomited.

2. A small blood-transfusion, given to correct anæmia, was followed by the transient appearance of bile pigments and salts in the urine.

3. Oxygen was given by a nasal tube for cyanosis due to the spasms. This was thought to do more harm than good by provoking spasms and was soon abandoned.

4. An intravenous drip was kept going throughout the period of chlorpromazine administration. The solutions were at first 5% dextrose and then half-strength Hartmann's solution (sodium lactate compound injection *B.P.*), of which about 500 ml. was given each day.

5. The electrolyte balance was carefully controlled (Dr. E. Jepson), and close attention given to oral hygiene (Mr. B. W. Fickling).

6. Considerable intravenous thrombosis occurred and was attributed to the chlorpromazine solution (25 mg. per ml.) despite the fact that it was diluted ten times before being injected into the tubing of the drip near the patient. 10 mg. of heparin was added to each bottle of intravenous infusion.

7. Large doses of tetanus antitoxin were given at the start of the illness.

8. Penicillin was given to prevent respiratory complications.

9. Every effort was made to deprive the patient of provocative afferent stimuli.

10. Very severe abdominal distension occurred towards the end of the period of chlorpromazine administration. The distension subsided. At the same time an erythematous rash developed on the back and scalp. It never became generalised and was attributed to excessive sweating. That the drug might have played a part in these cannot be denied, but it seems unlikely.

Discussion

Brooks et al. (1955), investigating the mode of action of tetanus toxin, found that it caused "a large development of polysynaptic reflexes" and suggested that this might be due to "the depression of inhibitory synaptic action on the interneurones" involved in these reflexes. Tetanus toxin acted by suppressing synaptic inhibition only; it did not convert inhibition into excitation.

Experimental work has shown that mephenesin acts mainly by depressing the spinal-cord internuncial neurones (Berger 1947) and the brain-stem reticular formation (Henneman et al. 1949). Dasgupta and Werner (1955) have shown that chlorpromazine almost certainly has similar actions.

In clinical medicine mephenesin is known to be active against tetanus muscle spasm (Belfrage 1947) and against spasticity and parkinsonian tremor (Schlesinger et al. 1948).

Chlorpromazine is also effective against spasticity and parkinsonian tremor (Basmajian and Szatmani 1955, Kelly and Laurence 1955) and against rabbit tetanus, as described earlier in this paper.

It was therefore reasonable to suppose that chlorpromazine would be effective against tetanus in man. The dose of mephenesin effective against local rabbit tetanus is 12 mg. per kg. body-weight, which is comparable to that known to be effective against tetanus in man (Davison et al. 1949, and many other reports).

Pentobarbitone will reliably abolish rabbit tetanus only in doses which cause loss of consciousness (unpublished observations), and this finding agrees with clinical experience of barbiturates in tetanus.

It therefore appeared likely that chlorpromazine, in the dosage which is effective against rabbit tetanus (1·0 mg. per kg. body-weight), might be useful in the treatment of human tetanus either alone or in combination with other drugs. Infused carefully, 1 mg. per kg. body-weight is not an excessive dose to give intravenously to man.

In addition to the central effects of chlorpromazine, Burn (1954) reported that 3 mg. per kg. body-weight had a direct depressant effect on skeletal muscle of cats. Such an effect could play a part in producing the results reported here.

While these experiments were being made, Hougs and Andersen (1954) published observations on the effect of chlorpromazine and promethazine on local tetanus in anæsthetised rabbits. The results recorded here substantially agree with theirs.

The present case is reported, not because it is thought that the outcome of one case can provide conclusive evidence of the value of a drug, but because it was a treatment chosen in the light of experimental evidence. It is our opinion that, if uncontrolled, this child would have died; but no doubt he could also have been treated successfully with thiopentone (with the concurrent disadvantage of unconsciousness), with neuromuscular-blocking drugs (with the necessity for continuous anæsthesia as well as artificial respiration), or with mephenesin (which is short-acting and has the disadvantage of having to be given in very large volumes of fluid by vein to avoid the hæmolysis which strong solutions cause). Chlorpromazine was used since it offered a possibility of controlling the convulsions without any of these disadvantages.

Possibly the most effective method will be to use a mixture of drugs, but it would be difficult to find two people agreed on the composition of the mixture. This situation is due to the absence of information on the relative efficacy of individual drugs against tetanus convulsions; and without this information the ideal combination is unlikely to be found.

To have given other drugs with the chlorpromazine would have prevented any definite conclusion as to whether the drug was capable of arresting tetanus spasm. The knowledge that chlorpromazine is more effective against tetanus in rabbits than are other drugs such as mephenesin, and the belief that there is no significant difference between animal and human tetanus, justified the very large doses.

We conclude that chlorpromazine is capable of controlling tetanus in man but offer no opinion on what place it may have in routine treatment. If the effect reported here is confirmed in other cases this drug might then be tested in combination with other drugs of known action against tetanus—e.g., barbiturates, mephenesin, and promethazine.

When treating severe tetanus boldness may be required in pressing drug therapy to the limits of safety. If the physician is not ready to do this he is liable to find himself at critical moments either changing from one drug to another, adding different drugs, or resorting prematurely to neuromuscular-blocking agents.

Forbes and Auld (1955) report the successful use of "constant intravenous infusion" of thiopentone, succeeded, as the patients improved, by oral paraldehyde or another barbiturate. They treated fifteen patients, sometimes using a different sedative drug as the principal agent. There were no deaths and it was never necessary, although some cases were severe, to proceed to the use of neuromuscular-blocking agents. They aimed at the abolition of severe convulsions and opisthotonos, but not at complete flaccidity. This technique, effective though it proved, must inevitably result in long periods of unconsciousness (Forbes and Auld give no information on this point), and this may account at least partly for the high rate of respiratory complications (ten patients required tracheotomy).

It is by work such as this, in which treatment was virtually confined to the use of barbiturates, that the efficacy of drugs against tetanus convulsions can be compared, and by such comparisons the reign of chaos over tetanus treatment may be ended.

Summary

Chlorpromazine and promethazine abolish the muscle spasm of experimental tetanus in rabbits.

These drugs probably act by depressing spinal-cord interneurones or brain-stem reticular formation.

Severe tetanus convulsions in a child were controlled by means of large doses of chlorpromazine alone.

We thank Mr. R. L. G. Dawson, of the plastic surgery unit, Mount Vernon Hospital, for the opportunity to treat the case reported here. One of us (D. R. L.) is grateful to Prof. G. Payling Wright for helpful discussions. The tetanus toxin was given by the Wellcome Research Laboratories. We are grateful to the resident medical and the nursing staff of Mount Vernon Hospital, especially Sister K. H. Joiner, for their coöperation.

ADDENDUM

Since this paper was completed Cole and Robertson (1955)[1] have confirmed the effect of chlorpromazine in clinical tetanus when combined with phenobarbitone or chloral hydrate.

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SYSTEMIC REACTIONS TO A MERCURIAL DIURETIC (MERCAPTOMERIN)

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THE great value of certain organic compounds of mercury in the treatment of œdema, especially that of heart-failure, is well established and many preparations are now in everyday use. The occasional occurrence of side-effects, some of them serious, is generally recognised and in particular their effect in causing or aggravating kidney damage. Conditions listed in *The Extra Pharmacopœia* (*Martindale*) (1952) as contra-indications to mercurial diuretics are acute nephritis and severe renal damage.

Toxic Reactions

We have classified the toxic reactions to these drugs into five main groups.

(1) Inflammation at the site of injection.

(2) Reactions attributable to the diuresis. These are related to disturbance of electrolyte balance, chiefly chloride depletion and dehydration. Pre-existing renal impairment predisposes to these upsets. Diuresis may cause concentration of nitrogenous waste products and uræmia (Barker 1937). Other manifestations are weakness, muscle cramps, and mental changes, with confusion, restlessness, excitement, coma, and death. Acute retention of urine may develop.

(3) Reactions caused by the mercury in the drug. The most important are renal damage, principally tubular, and gastro-intestinal lesions. The effects are albuminuria, hæmaturia, the passage of casts, anuria, stomatitis, excessive salivation, and hæmorrhagic colitis. A variety of skin lesions have also been described.

(4) Cardio-toxic effects, which include ventricular fibrillation and ventricular asystole. Although these are usually ascribed to the mercury ion, animal experiments suggest that different organic preparations of mercury produce different cardiac upsets (Chapman and Shaffer 1947). Further, these effects on the heart have been observed most commonly in animals given large doses. Some of the rare sudden deaths after intravenous injection of a mercurial in heart-failure in humans are attributed to an effect on the myocardium (Volini et al. 1945).

(5) Other sudden deaths after intravenous injection have been regarded as anaphylactoid reactions. Other allergic reactions described include fever, erythematous and urticarial skin lesions, bronchial spasm, and pulmonary œdema.

Acute attacks of gout, toxic psychosis, digitalis poisoning, spontaneous tetany, cerebral thrombosis, and the precipitation of grand mal in known epileptics have been listed among the toxic reactions. Of these, acute gout has been regarded as allergic; the others have been thought to be related to electrolyte disturbances or to dehydration after a large diuresis. Marrow depression with neutropenia and agranulocytosis has been described.

In 1942 Degraff and Nadler reported that all deaths from mercurial diuretics up to that time were associated with intravenous injection. We have now traced 3 deaths after administration by other routes: 1 followed an intraperitoneal injection (Molnar 1935); another was due to tubular necrosis with renal failure after prolonged dosage, mostly intramuscular (Waife and Pratt 1946); and in the 3rd case severe allergy developed after intramuscular injection (Wallner and Herman 1950).

Mercaptomerin

The need for a safe and effective mercurial diuretic that is easily administered is one which manufacturing chemists have endeavoured to satisfy. In mercaptomerin sodium ('Thiomerin' Sodium), a relatively recently introduced organic mercurial, the makers claims of low toxicity, satisfactory and often prolonged diuresis (Batterman et al. 1949, Herrmann et al. 1949, Winik and Benedict 1949, Stewart et al. 1950), and little or no locally irritant effects when given subcutaneously would appear well founded if one excepts some of the earlier batches of drug.

The studies of Lehman (1947) in experimental animals suggest that mercaptomerin is very much less toxic than certain theophyllinated mercurials as judged by changes in the Q R S of the electrocardiogram. Herrmann and his associates (1949), who noted the effect on the E.C.G.s of patients treated with intravenous mercaptomerin reported no significant changes in conduction or rhythm. The results of intradermal testing in humans (Ruskin et al. 1950), of subcutaneous and intramuscular injections in mice (Lehman et al. 1949), and prolonged use subcutaneously in routine clinical practice show so little evidence of reaction at the injection site that the preparation has been hailed as the mercurial diuretic of choice for home use by the patient or his relatives (Billman et al. 1950, Enselberg and Simmons 1950). These claims have not been accepted universally.

Observations on dogs made by Handley and his colleagues (1949) using the intravenous route suggest that, weight for weight in terms of mercurial content, mercaptomerin is more toxic than meralluride ('Mercuhydrin'). After injection mercaptomerin appears to dissociate somewhat slowly and both the therapeutic effect and infrequency of toxic reactions are believed to be related to that slow dissociation. Diuresis is less brisk but more prolonged than with other mercurial diuretics. Lehman et al. (1949) suggest that if sufficient time for dissociation of the compound is allowed mercaptomerin develops toxicity similar to that of other organic mercurials.

Our purpose is to draw attention to reactions which occurred in 4 patients who received mercaptomerin by subcutaneous injection. In 1 the development of hæmorrhagic colitis was ascribed to metallic mercury, while in 3 the reactions appear to have been allergic.

Case-records

Case 1.—Mrs. G. D., aged 70, was admitted to hospital on Nov. 12, 1952, because of increasing exertional dyspnœa for

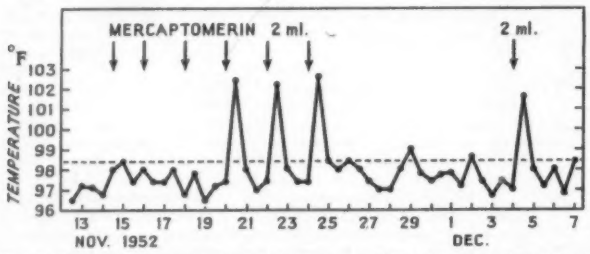

Fig. 1—Pyrexia after mercaptomerin in a woman of 70 with congestive failure.

one year, swelling of the ankles for one month, and attacks of nocturnal dyspnœa for three weeks. She had had pernicious anæmia, treated regularly and adequately with 'Anahæmin,' for sixteen years. Two months before admission her appearance and behaviour suggested myxœdema and subsequently she had thyroid (gr. 2 daily) without obvious effect. There was no personal or family history of allergy and she had not previously had any organic preparation of mercury.

She had severe orthopnœa and cyanosis with signs of congestive failure including moderate subcutaneous œdema. Pulse 100, regular. Blood-pressure 170/110 mm. Hg. Heart size uncertain because of obesity. E.C.G. showed left bundle-branch block. Urine normal.

Treatment in hospital initially included bed rest, morphia, and digitalis folia (gr. 3, reduced later to gr. 2, daily). When dyspnœa and œdema were unrelieved, mercaptomerin was started (2 ml. on alternate days subcutaneously). The resultant diuresis, though small, was considered worth while and the treatment was continued. After the fourth injection she became febrile but without symptoms or other physical signs. About one hour after each of the fifth and sixth injections she had rigors followed by about twelve hours of fever (maximum 102·4°F) (fig. 1). Each was accompanied by some increase in cyanosis, which was generalised, and by malaise and anorexia, the sixth injection causing more subjective upset than the fifth. None of these three upsets caused concern to nurses or doctors, and twenty-four hours after each of them recovery appeared complete. At the time of the third reaction the white-cell count was 14,800 per c.mm. (polymorphs 88·5%, eosinophils 0·5%, lymphocytes 10·5%, monocytes 0·5%). No malaria parasites were found on repeated examinations.

At this point it was recognised that the febrile upsets were probably related to the mercurial drug. Other patients in the ward who were receiving the same batch of drug did not react in this way, and the readily available literature on mercaptomerin gave no reference to febrile reactions.

On *Dec. 4* the seventh dose of 2 ml. was given subcutaneously. This was followed after one hour by rigor, extreme malaise, and cyanosis (temperature 100·6°F; pulse 126, regular, small volume, and at times impalpable; blood-pressure 90/60). Later that day she vomited twice and passed six fluid stools.

On *Dec. 5* she was afebrile but still drowsy and cyanosed with evidence of peripheral circulatory failure (blood-pressure 60/35). Adrenaline by injection appeared to increase the cyanosis. Blood chemistry: Na 310, Cl 342, K 21·5 mg. per 100 ml. No more than 1–2 oz. of urine was passed, incontinently. During the day she had oral cortisone (150 mg. in three divided doses) and was kept in an oxygen tent. She received no other corticoid. The drowsiness and signs of peripheral circulatory failure lessened during the day; the pulse-volume improved, and the blood-pressure rose to 90/60. The 24-hour output of urine was 18 oz.

On *Dec. 6* the slow improvement was maintained. Blood-pressure 100/70. Urine output 12 oz. E.C.G. no change since admission.

She continued to improve slowly though blood-pressure remained low and on Dec. 19 was only 150/85. At no time during the stay in hospital was any preparation of liver, vitamin B_{12}, or thyroid given to her.

Case 2.—Mr. H. H., aged 57, was admitted to hospital on Oct. 17, 1953, with a nine-month history of dyspnœa on effort and more recently attacks of paroxysmal dyspnœa. His own doctor had already given several injections of mersalyl without untoward effect. There was no personal or family history of allergy.

He had an enlarged heart with atherosclerotic aortic stenosis and auricular fibrillation. Blood-pressure 150/90. E.C.G. showed left ventricular preponderance. Urine normal.

In hospital he was confined to bed and digitalised. On Oct. 18 1 ml. of 'Neptal' was given intramuscularly without ill effect. On Oct. 20 he received mercaptomerin (2 ml. subcutaneously) and this was repeated on alternate days until he had received 10 ml. of the drug in five doses. About twenty-four hours after the first injection of mercaptomerin a generalised irritating erythematous rash developed. This was not associated with fever and rapidly receded under treatment with promethazine ('Phenergan') (25 mg. b.d.). It was thought that the rash probably indicated sensitivity to a barbiturate used to sedate him, but to determine the offending preparation particular drugs were discontinued and then reintroduced. Butobarbitone ('Soneryl') (gr. 3) caused no untoward reaction.

On Nov. 11 a test dose of 0.5 ml. of mercaptomerin was injected subcutaneously. Within a few minutes erythema developed around the injection site. About an hour later the patient experienced tightness in the chest and epigastrium and breathing became laboured. He rapidly became extremely shocked (pulse 45; blood-pressure 70/30; heart-sounds so soft as to be barely audible). He remained in this state for about an hour and then slowly improved so that within six hours he was relatively well again. His condition was so suggestive of an acute coronary attack that two E.C.G.s were taken. The first, twenty minutes after the onset of the attack, showed increased T-wave inversion in the left lateral chest leads. A further tracing next day was substantially the same as that on admission and showed no evidence of myocardial infarction. His further stay in hospital was uneventful. There was no rise of temperature after any of the injections of diuretic.

Case 3.—Mr. B. H. M., aged 47, was admitted to hospital on Sept. 27, 1954, with increasing dyspnœa on exertion and angina of effort for one year. Ankle swelling had been noticed more recently. There was no personal or family history of allergy.

There were signs of congestive failure and the heart was moderately enlarged. Pulse irregular due to auricular fibrillation. Blood-pressure 120/60. The lungs showed signs of emphysema and congestion.

Measures to relieve heart-failure included salt restriction, digoxin, and mercaptomerin, which was given subcutaneously in a freshly prepared solution. Three injections, each of 2 ml., were given in all and after each the diuresis was satisfactory. Thirty-six hours after each dose the temperature rose (fig. 2) and the febrile response increased with each injection. The first two reactions were small and there were no other symptoms, but the third was accompanied by malaise and chills. Mercaptomerin was therefore discontinued, and during his remaining stay in hospital he was afebrile. Serum chemistry and urine were normal throughout. No other cause for febrile episodes was discovered.

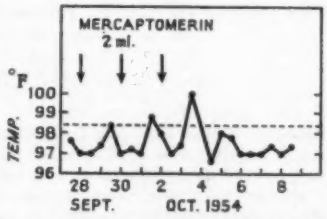

Fig. 2—Pyrexia after mercaptomerin in a man of 47 with congestive failure.

Case 4.—Mr. S. V. B., aged 47, was admitted to hospital on Dec. 7, 1953, with a three-week history of angina of effort, dyspnœa on exertion, and increasing ankle swelling. There was no previous history of allergy.

He had early congestive failure with distended neck veins, orthopnœa, ankle œdema, and hepatomegaly. The heart was moderately enlarged. Pulse regular. Blood-pressure 105/65. Blood-count and urine were normal. Chest radiograph showed lungs much striated, as in bronchitis, with a small amount of pleural elevation at the left base.

Treatment included salt restriction and mercaptomerin. The solution was freshly prepared and given subcutaneously. Five doses were given altogether at intervals of two days; the first was 0.5 ml. and the other four 2 ml. each. After the third injection the temperature rose, and this fever persisted for five weeks; the highest reading was 102°F. On the day

of the fifth and last injection a bloody diarrhœa began and persisted for four weeks, gradually abating. No infective cause could be found. Sigmoidoscopy on two occasions revealed a granular bleeding rectal mucosa with a few shallow ulcers. The urine was normal throughout. He was not given dimercaprol (BAL) or other specific treatment for heavy-metal poisoning. At the time of his discharge on Jan. 25, 1954, he was free from all bowel symptoms.

Discussion

The reactions in these 4 patients were of two types: in the first 3 they appear to have been allergic, while in case 4 the hæmorrhagic colitis is most easily explained by excretion of metallic mercury through the wall of the gut —a well-recognised sequel of poisoning with inorganic mercury. The discussion which follows deals mainly with the allergic reactions.

Most published reports on mercaptomerin and the makers' original claims suggest not only a low incidence of reactions at the site of injection but also virtual absence of general systemic toxic reactions. Herrmann et al. (1949), however, reported 2 patients who had mild systemic reactions—chills, fever, and diarrhœa. Gold et al. (1952) also reported mild systemic reactions (muscle pain and fever). The systemic toxic reaction was severe in 3 of our patients and mild in 1 (case 3). In cases 1 and 2 the reactions were characterised by severe prostration and circulatory collapse, and in cases 1 and 3 by fever. We can find no published account of so severe a reaction as those observed in cases 1 and 2 though reactions more or less similar both in type and severity have been reported with other organic mercurial diuretics given by various routes—e.g., Snell and Rowntree (1928) (intravenous 'Merbaphen'), Gelfand (1949) and Harris (1953) (intramuscular mercuhydrin), and Andrews (1931) (intravenous 'Salyrgan').

In their time relationship to the giving of the injection and in the prominence of cyanosis and circulatory collapse, the reactions in our patients are very similar to those described following the use of other mercurials. Certain characteristics of these reactions suggest an allergic mechanism. Harris (1953) points out that they rarely follow the initial dose of the drug. Their severity increases with each successive dose and is unrelated to the size of the dose. The arguments in favour of an allergic basis are well stated by Gelfand (1949) who, in a patient treated with mercuhydrin, also demonstrated skin sensitivity to serum from another patient treated with mercuhydrin. It appears that the effect of the first few doses is to sensitise the patient and that later doses induce an allergic response. In most cases and initially this response is mild; fever, chills, and cutaneous eruptions being common manifestations. The early reactions in our first 3 patients were of this order. When, in such cases, the use of the same mercurial is continued, even in small doses, violent and dangerous reactions may follow (cases 1 and 2). In case 3 if treatment had been continued more severe reactions would probably have occurred. Here it may be mentioned that cases 1 and 2 were under the care of different members of the staff and that their assessments of the illness which followed the use of the drug were almost identical. In each case those concerned suspected an acute coronary attack and anticipated a fatal result.

In case 1 the reaction after the last injection was unusually long and severe. Improvement appeared to follow cortisone and we should use that drug again in similar circumstances. In seeking safeguards against such reactions, the absence of any past history or family history of allergy in our patients is important. Harris (1953) states that preliminary skin-testing is rarely helpful in detecting latent allergy.

It is interesting that hypersensitivity to one organic mercurial may not imply hypersensitivity to other members of the group (Fox et al. 1942). Conversely, lack of allergic response to one compound is no guarantee that other compounds would be safe (case 2).

The variations in the organic moiety from preparation to preparation could reasonably explain variations in the incidence of allergic reactions. Gold et al. (1952), who endorse the view that some patients have apparently allergic reactions to mercaptomerin, suggest that dissociation of the organic mercurial into its inorganic and organic moieties is necessary for both the therapeutic action and toxic effect.

Our 4 cases were collected within a period of two years from a hospital with about 120 general medical beds and this suggests that systemic reactions to mercaptomerin may not be rare. The drug was given as directed by the makers. The 4 cases were under treatment when different consignments of drug were in use in the hospital. Other patients treated with the same batches of mercaptomerin were not affected.

It is apparent that mercaptomerin can cause a generalised systemic reaction. Degraff and Nadler (1942), referring to all organic mercurial diuretics, asserted "that all of the commercially available drugs of this group have at some time or another been reported as producing alarming symptoms." Mercaptomerin does not appear to be the exception and reactions to that drug may be extremely severe. The patient's history is unlikely to indicate a probable reaction. On the other hand, unexplained fever, especially if repeated, after the injection of an organic mercurial is, in our opinion, an indication to stop giving that preparation and to use a different one. Attempts to establish the guilt of the original compound are not without risk to life.*

Summary

4 patients had systemic toxic reactions to subcutaneous injections of mercaptomerin ('Thiomerin'). The reactions did not appear to differ from those induced by other organic mercurial diuretics given by other routes. The mechanism of the reactions is discussed.

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* In the leaflet enclosed with each bottle the makers of 'Thiomerin' Sodium now include the following note: "Discontinue injections if symptoms of hypersensitivity to mercury appear, as flushing of the face, fever, chills, gastrointestinal disturbances, cutaneous eruptions, pruritus, or urticaria. Some individuals may be sensitive to one mercurial yet tolerate another."

PSYCHOTIC MOTHERS

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NOWADAYS much emphasis is placed on the child's need, if he is to develop normally, for close relationship with an affectionate mother. The work of child-guidance clinics is directed to this end; and now an effort is being made at infant-welfare clinics to help mothers solve problems within themselves or their children, so that mother and baby can get on together as well as possible from the earliest days of the child's life. But some women cannot benefit from such help—namely, those with postpartum psychosis.

In such cases the acute psychotic episodes end fairly rapidly; but the patients tend to relapse, and the illness usually lasts for some months. The consequent separation of mother from child in the child's first year of life may impair its ability to form good relationships later on.

Zilboorg (1931) and Deutsch (1947) remark that postpartum psychosis is not a specific entity, but a breakdown into schizophrenic or depressive or other illness according to the patient's predisposition. Nevertheless all cases have one feature in common—hostility to the baby. The patient's inability to bear this hostility causes her personality to break up and earlier infantile conflicts to be brought to life so that she becomes psychotic.

The old-fashioned remedy in such cases was to separate mother and child; and this often proved efficacious. The child was tended by a nurse or a relative; and the mother, relieved of the unbearable hostility, was more likely to recover. Today suitable mother-substitutes are rare. Moreover, the mother who has been admitted to an observation ward or a mental hospital for treatment, though she usually recovers in hospital, commonly relapses when she is again required to care for her baby.

This difficulty has been overcome in a small series of cases by admitting the baby along with its mother. The husband's coöperation was sought, and the methods and aims of the treatment explained to him. While the nurses undertook the physical care of the child, the mother was encouraged to do as much for the child as she felt able; and she was enabled to discuss her sentiments about this with a psychotherapist, who tried to gain the mother's confidence.

Under this arrangement psychotherapy proceeded surprisingly quickly, probably because after childbirth primitive drives are strong, and thought processes which at other times are unconscious are more readily accessible. Thus the patient would consider and discuss fairly readily her past relationships and attitudes to herself and others, and would accept interpretations which at another time would have been strongly resisted, and make good use of these interpretations to resolve her difficulties. Once this stage was reached, the patient gradually withdrew her interest from the psychotherapeutic sessions and transferred it to her baby.

Thus the mother got to know the baby at her own pace, and had the daily reassurance that, despite all her own strange mixed feelings towards her infant, it still survived with the detached physical attention given by the nurses. As her fear of her own negative feelings to the child lessened she gained more confidence to undertake its physical care; but she was not detached, for she felt that she could give her baby more than anybody else. She could then become, as Dr. D. W. Winnicott has put it, "an ordinary devoted mother."

Of the following four cases, the first two illustrate the tendency to relapse when full care of the baby is undertaken before the patient is ready for this, and the last two show how such relapses can be avoided.

Case-records

Case 1 was a pretty, intelligent young woman, married to a man much older than herself on whom she could rely for security. Being the youngest of a large family she had been pampered and treated as the delicate one. She had always suffered from many minor ailments, including palpitations for which no organic cause could be found. After three years of marriage the patient became pregnant. She was well throughout pregnancy but towards the end was worried as to whether she would be able to care for the baby adequately.

She was not noticed to be abnormal during the puerperium, but she felt very inadequate when she got home. With much support from relatives she managed until the baby was 5 months old, when she became more tense and strained, then expressed delusional ideas, believing without reason that a film had been made about her and that other people were wearing her clothes and impersonating her. She became withdrawn, and had to be admitted to an observation ward.

Over the next two weeks the patient gradually became more in touch with reality. When she was able to talk about her illness she admitted having felt depressed and inadequate since the birth of her child; she said that this was because her relatives had done too much for her, and she was overconfident that she would remain well. She was perplexed about her state of mind immediately before her admission to hospital, and could give no clear account of it. She insisted on going home and taking full responsibility for her baby.

When seen at the outpatient clinic the following week she was again withdrawn. She sat staring in front of her; she was disorientated in time and spoke off the point, saying such things as "are you going to bury me, is my baby dead?" Yet again she made a rapid superficial recovery in the observation ward, but in view of the previous failure to maintain improvement she was persuaded to enter a mental hospital as a voluntary patient.

There she was given a course of deep insulin therapy with electroconvulsion therapy (E.C.T.) in sopor towards the end of the course. Schizophrenia with hysterical features was diagnosed at the mental hospital where the prognosis was regarded as not very favourable. She left against advice after three and a half months.

On returning home she once more tried to look after her child, this time succeeding for several weeks until she became as seriously disturbed as before, so that it was necessary for her to be admitted to the observation ward yet again. This time, with the agreement of the superintendent of the mental hospital in which the patient had recently been, she was admitted to the neurosis ward of the general hospital with her baby also in hospital, and was treated by psychotherapy and gradually undertook the care of her baby. She made a good recovery, and was discharged home after three months. She has remained well and has cared for her child in the subsequent two years.

Case 2 was the youngest of several children. The mother died when the patient was 3 years old, so she was brought up by her father and an older sister. She was considered a fairly normal child but did not mix well with children of her own age. When she first became engaged to be married, and again just before her marriage, she had a "nervous breakdown" for which she received treatment at home, and she recovered. She was strongly attached to her father. Her husband was an immature young man who could lend the patient little emotional support. They both wanted the baby.

While in hospital when the child was 5 days old, the patient suddenly made a suicidal attempt. She tried to throw herself out of a window, but was forcibly restrained by a nurse. She was deeply depressed; and she was also deluded, believing that her husband had deserted her (whereas he was visiting her regularly), and that she was to be sent to prison for all the wrong that she had done. On account of persistent suicidal intention, she had to go to a mental hospital under certificate.

A course of E.C.T. led to a good recovery, and she was discharged home to look after her baby; but two weeks later she was admitted to an observation ward again. She made a rapid superficial recovery. On her discharge the baby was put with foster-parents and the patient got a job, where she seemed quite

normal and worked well. After some weeks, since the patient seemed so settled, the baby was brought home and the patient looked after him. Almost immediately she began to relapse, until she was again so depressed that she had to be admitted to an observation ward. Here once more she made a rapid superficial recovery.

She was transferred to the neurosis ward, and was told that she could have the baby in hospital with her; but this she thought was no use since she felt that she would never again be a good wife or an adequate mother. She wished to go out to work so as not to be a burden on her family. She was allowed to go out to look for a job, but after a time she decided to try having the baby in hospital. She became more depressed for a time, and was by now very drawn and haggard. Psychotherapy was continued, and gradually the patient did more for the child, became less depressed, and made a good recovery which has enabled her to look after her child for the subsequent two years.

Case 3 had been a quiet child, who mixed poorly and had difficulty in asserting herself. She was thought to have been spoilt by her parents. Her husband was perhaps rather obsessional, but was very reliable and helpful to the patient and was clearly fond of her. The baby was wanted; the labour, which was normal, was conducted in the patient's own home. The patient found feeding the baby difficult, and despite much support and help she became gradually more withdrawn, until, when the baby was a month old, she was very strange in manner, and told her husband that she had pneumonia (although really she was physically fit), that she felt that people were accusing her of neglecting the child, and that she was going to be stoned to death. She was admitted to the observation ward, where she became well enough to be transferred after seventeen days to the neurosis ward. Her husband encouraged her to stay, and brought the baby to her in hospital. She was treated by psychotherapy, discussing her fears about the child, and her difficulty in caring for him, besides her past relationships, particularly with her parents. She made a good recovery. She has remained well and has cared for her child without interruption for two years.

Case 4 was brought up in a Dr. Barnardo's home from the age of four years, because her mother, who was pregnant at the time of her husband's death, could manage to care for only the youngest and oldest of her nine children. The mother visited the patient infrequently, so gradually they meant less to each other. After leaving the home the patient did a domestic job until her marriage. In the puerperium she became depressed, and so was transferred to the psychiatric unit, where she attempted suicide and continued to get more depressed. She was transferred to a mental hospital under certificate.

After two months in the mental hospital, during which she had a course of E.C.T., she was discharged recovered, and was referred back to the outpatient department. This patient stayed at home with her husband while the baby remained in the nursery, where he had been while the patient was in hospital. The matron of the nursery coöperated with treatment, allowing the patient to choose how much she did for the baby, and encouraging her to come to the nursery as often as she wished. The patient attended the outpatient department for psychotherapy several times a week. At this time she discussed her relationship to her husband and child, whereas in her more disturbed state she had discussed her past relationships. The patient gradually assumed charge of the baby, until she took him home and was fully responsible for him. She has not relapsed.

Six patients have been successfully treated in this way and have not relapsed in the two years over which they have been followed up. This series, though small, suggests that in cases of postpartum psychosis the patient should be treated in a unit to which her baby is also admitted.

This work was done in the psychiatric, maternity, and pædiatric departments of the West Middlesex Hospital.

I would like to thank Dr. F. P. Haldane, psychiatrist, West Middlesex Hospital, for permission to publish this paper, and Miss H. B. Schaler for assisting in the follow-up.

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δ-AMINOLÆVULIC ACID AND PORPHYRIA

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IN 1954 Goldberg et al. showed that porphobilinogen has no pharmacological actions which can explain the symptoms of acute porphyria. The immediate precursor of porphobilinogen is δ-aminolævulic acid (Dresel and Falk 1953, Gibson et al. 1954, Granick 1954, Schmid and Shemin 1955) which can take the place of glycine and "active" succinate in the synthesis of porphyrin and hæm (Shemin and Russell 1953, Neuberger and Scott 1953) and is excreted in the urine by patients with acute porphyria (Granick and Vanden Schrieck 1955). We have therefore investigated some of the pharmacological properties of δ-aminolævulic acid, using two samples of the hydrochloride kindly placed at our disposal by Prof. A. Neuberger, F.R.S., and Dr. J. J. Scott.

During attacks of acute porphyria the patient may have hypertension and tachycardia. In the cat, δ-aminolævulic acid in doses of 100 μg. per kg. body-weight (in one test 0·5 mg. per kg.) did not alter heart-rate or blood-pressure. There was neither potentiation nor inhibition of responses to adrenaline or to noradrenaline.

Other symptoms of an attack of acute porphyria may be abdominal pain, constipation, and distension of the large gut. Isolated guineapig ileum gave no response to a dose of 100 μg. in a 20-ml. bath. In this dosage δ-aminolævulic acid had no effect on contractions produced by histamine, by acetylcholine, and by 5-hydroxytryptamine. On isolated rat's colon the same dose had no effect and did not alter the responses produced by acetylcholine and by 5-hydroxytryptamine.

The result of this preliminary investigation suggests that δ-aminolævulic acid does not possess any pharmacological properties that might explain the cardiovascular and the abdominal symptoms which are a constant and prominent feature of an attack of acute porphyria. δ-Aminolævulic acid administered by mouth to man is rapidly excreted by the kidney (Berlin et al. 1954a), as is porphobilinogen (Goldberg and Rimington 1954), and causes no symptoms resembling those of acute

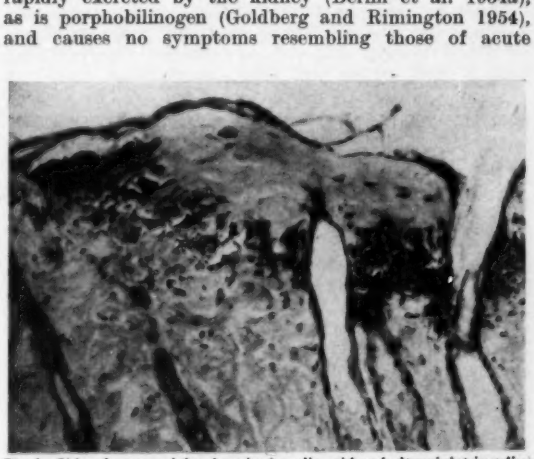

Fig. 1.—Skin of rat receiving δ-aminolævulic acid and ultraviolet irradiation. Note early blister, gross damage to collagen, and lymphocytic infiltration. (Hæmatoxylin and eosin. ×160.)

OBSERVATIONS ON RATS RECEIVING δ-AMINOLÆVULIC ACID OR PORPHOBILINOGEN WITH AND WITHOUT EXPOSURE TO ULTRAVIOLET RADIATION

Treatment (dose of drug 30 mg. per kg. of body-weight)	Symptoms	Ultraviolet fluorescence		Skin histology	Urine (24 hours)
		Skin (frozen sections)	Intestines		
δ-Aminolævulic acid and ultraviolet irradiation	Irritability hyperæmia of skin	+ + + In stratum corneum	+ + +	Subepidermal blisters; infiltration (fig. 1)	..
δ-Aminolævulic acid without irradiation	Nil	+ + In stratum corneum	+ +	Normal (fig. 2)	Coproporphyrin 1·65 µg., protoporphyrin 0·16 µg., uroporphyrin 0·24 µg., porphobilinogen ? trace
Porphobilinogen and ultraviolet irradiation	Nil	+ In stratum corneum	+ +	Normal (figs. 3 and 4); one selected area shows collagen damage and infiltration (fig. 4)	Corproporphyrin 0·48 µg., protoporphyrin 0·10 µg., uroporphyrin 17·2 µg., porphobilinogen + +
Ultraviolet irradiation only	Nil	? Trace	+	Normal (fig. 5)	..

porphyria. The important observation has, however, been made, in a self-experiment by Dr. Scott, that its ingestion is followed by transitory hypersensitivity to sunlight (Berlin et al. 1954a and b, Scott 1955).

Granick and Vanden Schrieck (1955) injected δ-aminolævulic acid 130 mg. per kg. body-weight into a white rat intraperitoneally and observed no symptoms of distress. The rat's urine next day contained a little zinc-porphyrin complex, but the contents of the stomach

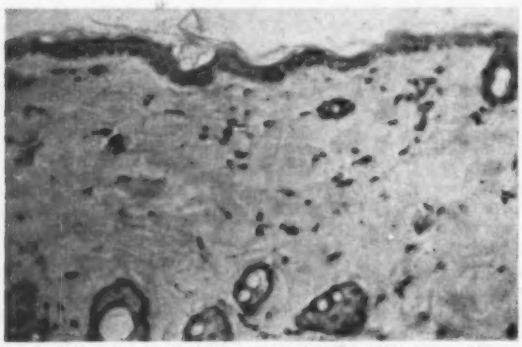

Fig. 2—Skin of rat receiving δ-aminolævulic acid only. Normal histology. (Hæmatoxylin and eosin. ×160.)

and duodenum, and the femoral bone-marrow fluoresced strongly in ultraviolet rays.

Investigation

We have compared the effects of subcutaneously administered δ-aminolævulic acid and porphobilinogen on albino rats with and without exposure to the radiation from a small carbon arc. The animals were shaved on the back and sides, and 10 minutes after an injection (30 mg. per kg. body-weight) were exposed, with shaved but uninjected controls for 15 minutes at 12 inches distance. There was no overheating under these conditions.

The control rat and the rat injected with porphobilinogen showed neither irritability nor hyperæmia, but the rat injected with δ-aminolævulic acid and irradiated showed definite signs of irritability, such as scratching, biting, and shaking itself—movements which continued for some time after removal to the cage—and its skin was hyperæmic. The rat given the same dose of δ-aminolævulic acid but not exposed to ultraviolet rays appeared perfectly normal.

All the rats were killed after 24 hours, and portions of their skins were fixed, sectioned, and stained or examined immediately (frozen sections) by ultraviolet fluorescence microscopy. The thorax and abdomen were also opened in each rat for macroscopic examination under ultraviolet rays. The findings are listed in the accompanying table, and the histological changes in the skin are recorded in figs. 1–5.

Discussion

A considerable amount of porphyrin is formed from both δ-aminolævulic acid and porphobilinogen, the greater part being eliminated via the bile into the intestine (Granick and Vanden Schrieck 1955, Scott 1955). The comparatively large quantity of uroporphyrin in the urine of the rat given porphobilinogen may have been derived non-enzymically (Cookson and Rimington 1954) from porphobilinogen, which was also present in the urine. Only the combined treatment with δ-aminolævulic acid and irradiation caused photosensitivity, and fluorescence due to porphyrin was more intense in this rat than in the one not exposed to the arc-light. The difference in fluorescence was greatest in

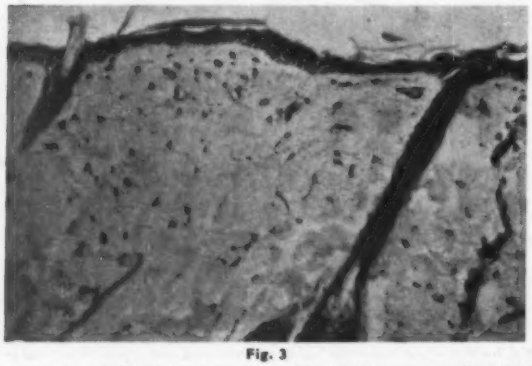

Fig. 3

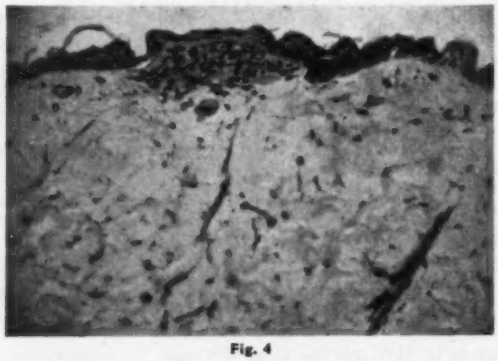

Fig. 4

Figs. 3 and 4—Skin of rat receiving porphobilinogen and ultraviolet radiation. Histology generally normal (fig. 3), but occasional affected areas (fig. 4) with minor collagen damage and some infiltration. (Hæmatoxylin and eosin. ×160.)

the epidermis, suggesting an intensification by irradiation of the transformation into porphyrin. Pimenta de Mello (1951) found the urinary coproporphyrin of lead-poisoned rabbits to be much increased by exposure of the animals to ultraviolet rays, and Gillman et al. (1945) observed an increased amount of porphyrin in biopsy specimens of human liver from pellagrins after body irradiation.

A factor which may play a dominant rôle in determining the distribution of porphyrin after injection of either δ-aminolævulic acid or porphobilinogen is the relative ease with which these two precursors may enter cells. Fowl erythrocytes permit the ready entry of δ-aminolævulic acid but are much less permeable to porphobilinogen (Falk et al. 1956). Should these permeability differences extend to other cells, one could imagine the rapid entry into the epidermis (and tissues generally) of δ-aminolævulic acid from the body-fluids and its transformation there into uroporphyrin, enhanced perhaps by light; the brilliant fluorescence of the exposed epidermis and its injury under irradiation would therefore be understandable.

More detailed work is obviously necessary to substantiate this hypothetical explanation of the present findings, but a further analysis of the problem, together with assays of excreted δ-aminolævulic acid and porphobilinogen by patients with porphyria having cutaneous

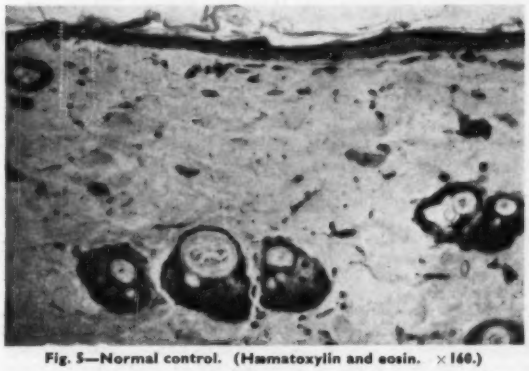

Fig. 5—Normal control. (Hæmatoxylin and eosin. ×160.)

and abdominal symptoms respectively, should help us to understand the chemical-pathological differences between these types. At any rate it seems to be acceptable, from the experiments here recorded, that δ-aminolævulic acid alone cannot be held directly responsible for the abdominal or cardiovascular disturbances seen in the typical attack of acute porphyria.

Frozen sections were prepared by Mrs. J. Hardy and photomicrographs by Mr. A. Bligh. Dr. R. Moulton assisted in the pharmacological preparations, and Miss B. Tooth with the urine analyses.

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CONN'S SYNDROME WITH SEVERE HYPERTENSION

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WE describe here a patient in whom an excessive loss of potassium in the urine was associated with the presence of a benign adrenocortical tumour, and was abolished by its removal. When this patient first came under our care, Conn's (1955a) account of primary aldosteronism had not been published, and we were content to attribute the loss of potassium to a primary renal lesion. The patient was not acidotic, however, and her urine could be acidified; so her case was comparable to that of Earle et al. (1951), and contrasted with the more usual "potassium-losing nephritis" in which failure of hydrogen-ion excretion accompanies the inability to conserve potassium.

When Conn (1955a) described his patient in whom a salt-retaining hormone was secreted in excessive amounts by an adrenocortical tumour, and suggested that other cases of supposed potassium-losing nephritis had a similar cause (Conn 1954), we reinvestigated our patient (who had meanwhile been kept well with a supplement of potassium) and found a tumour of the right adrenal gland. This patient differs from the small number already recorded (Conn 1955b) in several respects, among which was her severe hypertension. The satisfactory fall in blood-pressure which followed operation supports Conn's suggestion that other such cases should be sought among hypertensives.

Case-report

A housewife, aged 43, was admitted to hospital in February, 1954, because of weakness of the limbs and neck and diarrhœa. For nine days she had had up to six watery motions daily, without mucus or blood. At 2 A.M. on the sixth day she was awakened by nausea; on trying to get up to vomit she found that she could not move her limbs or raise her head off the pillow. For about three years she had had attacks, each lasting about a week, in which her arms felt stiff and useless; she was unable to perform actions requiring sustained muscular contraction, such as holding a knife to cut bread. Her husband noticed that during these attacks her head would loll forward, and that when she walked her feet would slap on the floor. About the time that these attacks began she noticed excessive thirst, worse during the attacks, but present also during the intervals between them. This was accompanied by nocturia, at first infrequent but becoming more severe, so that she had regularly had to pass urine three or four times a night. She had never noticed any abnormality of the urine, nor had she had any symptoms suggesting a urinary infection. No member of her family had had any kind of paralysis.

Examination

The weakness was patchy and asymmetrical. The patient could not lift her head off the bed, abduct either arm, or extend either elbow; flexion of the left elbow, grip of the right hand, and flexion of the hips and knees were also weak. Other movements were strong. The tendon-reflexes were brisk, and

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there was no abnormality of sensation. Chvostek's and Trousseau's signs were negative. The temperature was 99·8°F, the heart-rate 100 per min., and the blood-pressure (which had never been measured before) 130/95 mm. Hg. She had diarrhœa and was incontinent of urine. The diarrhœa continued in hospital for only four days, during the last two of which chloramphenicol was given. No pathogenic organisms were cultured from the stool.

Investigations

In the serum the level of potassium was 1·7, of sodium 147, of chloride 104, and of bicarbonate 29 m.eq. per litre. The electrocardiogram showed evidence of potassium deficiency.

Treatment and Progress

Potassium acetate was given by mouth, about 90 m.eq. being administered in the first sixteen hours. Since there was no increase in muscle power or in potassium level the rate of administration was increased to about 250 m.eq. per twenty-four hours. Muscle power then improved but was not normal until four days later. On the sixth day, when the potassium level in the serum was 6·5 m.eq. per litre, the potassium was discontinued; by this time she was taking food.

On the third day she complained of pins-and-needles in the fingers and toes, and was found to have latent tetany; this continued for almost forty-eight hours.

The urine contained a trace of protein and was nearly neutral (pH 6·7–7·1); the highest specific gravity after eighteen hours' water deprivation and injection of 5 ml. of 'Pitressin' was only 1·010. The centrifuged deposit contained a few white blood-cells, but cultures were sterile. The blood-urea was 82 mg. per 100 ml. on admission, and 72 mg. per 100 ml. two weeks later. Seven months later it was 40 mg. per 100 ml.

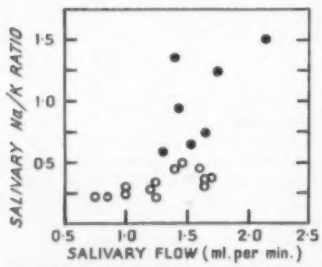

Fig. 1—Salivary sodium/potassium ratios plotted against rate of salivary flow. Open circles represent preoperative samples, black circles postoperative samples.

Renal conservation of potassium was defective. During an eleven-day period when the level of potassium in serum varied between 1·7 and 2·1 m.eq. per litre, the mean daily output of potassium in the urine was over 70 m.eq. During a five-day period in which the patient was given ammonium chloride (115 m.eq. per day) the urine pH fell to 5·1, and the urinary content of titratable acid minus bicarbonate rose from −9 to +23 m.eq. per day, and of ammonium from 36 to 119 m.eq. per day.

The patient remained well from the fifth day in hospital. She was discharged after a stay of six weeks. After discharge she took 80 m.eq. of potassium chloride daily, and said that she felt better than she had for some years; but the thirst continued.

When the dehydration and electrolyte depletion had been corrected her blood-pressure had risen, and it varied between 160/90 and 230/120 mm. Hg. During the twelve months between discharge and her second admission she continued to be hypertensive, the highest recorded pressure being 220/150 mm. Hg.

Second Admission

In April, 1955, the patient was readmitted for further study as a possible case of Conn's syndrome. Her blood-pressure was 225/140 mm. Hg with 20 mm. of pulsus alternans; triple rhythm was heard, and radiography showed enlargement of the heart; the fundi were normal. Although the blood-pressure fell slightly during her stay in hospital (fig. 5) it continued to be high, and when, after a short time at home, she was readmitted on June 8 for operation, it was 205/130 mm. Hg.

To show whether the patient had a tumour secreting salt-retaining hormone, three main lines of investigation were followed.

Salivary sodium and potassium levels.—Conn (1955a) suggested that a low ratio of sodium to potassium in saliva and sweat indicated increased activity of salt-retaining hormone; it was largely this finding that led him to postulate such increased activity as the cause of the electrolyte abnormality in his patient, since it showed that the abnormality of excretion was not confined to the kidney. In our patient this ratio was found to be low (fig. 1).

TABLE I—CORTISOL AND ALDOSTERONE LEVELS IN BLOOD AND URINE

Date (1955)	Specimen	Cortisol in whole blood or 24 hr. urine (μg. per 100 ml.)	Aldosterone in whole blood or 24 hr. urine (μg. per 100 ml.)
Jan. 20	Blood	2·7	<0·1
May 4	Blood	4·2	<0·1
March 8–9 ..	Urine	40	8
May 4–5 ..	Urine	35	11
May 5–12 ..	Urine	21	28
June 10	Operation		
Sept. 25–26 ..	Urine	8·7	1·1

Assays of *aldosterone in the blood and in the urine* were made by Mrs. S. A. Simpson and Dr. J. F. Tait at the Middlesex Hospital Medical School, who reported as follows: "The blood was extracted at neutral pH. Cortisol (hydrocortisone) and aldosterone were fractionated and estimated as described in detail previously (Simpson and Tait 1955). The urine was continuously extracted at pH 1 with chloroform for 24 hours at room-temperature and the resulting free cortisol and aldosterone purified by column chromatography. The aldosterone was measured by bio-assay at this stage. Aldosterone diacetate and cortisol monoacetate were also prepared from this fraction and, after purification, estimated by the soda fluorescence method (Bush 1952). A detailed description of the methods will be submitted for publication elsewhere.

"The aldosterone and cortisol were analysed in a 200 ml. sample of blood collected at 9.30 A.M. on Jan. 20, 1955, and May 4, a 24-hour specimen of urine on March 8–9 and May 4–5, and in a 7-day bulked collection of urine between May 5 and 12. The results, together with those in a postoperative specimen of urine taken on Sept. 25–26, are shown in table I. The values for aldosterone using the bio-assay procedure showed good agreement with those found by the physico-chemical method within the limits of experimental error.

"The mean value for cortisol in peripheral blood collected at 9.30 A.M. from normal males determined by the method used in the present investigation has been found to be 2·7 μg. per 100 ml. whole blood, with a range of 0·5–4·7 μg. for eleven individual determinations: a pooled specimen from twenty volunteers gave a value of 2·5 μg. per 100 ml. The mean value for aldosterone from the same subjects was 0·08 μg. per 100 ml. The mean value of the amount of cortisol in urine collected from six male patients not suffering from any obvious endocrine disease has been found to be 43 μg. per 24 hours, with a range of 23–57, and that of aldosterone in the same urine 12 μg. per 24 hours with a range of 8–16. Thus only the pooled urine

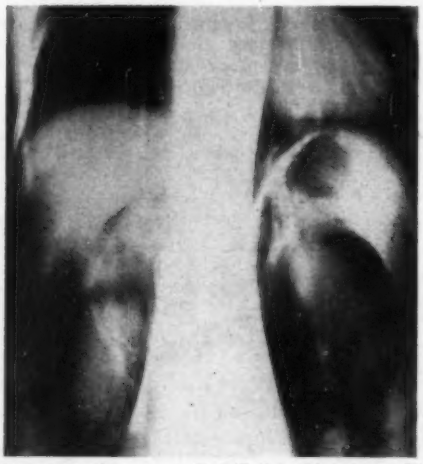

Fig. 2—Tomogram after presacral insufflation with oxygen. Triangular shadow above each kidney is cast by adrenal. Round tumour is seen at apex of right adrenal.

sample of the present patient (May 5–12) showed an abnormally high aldosterone content as far as can be ascertained with the limited data so far available. The extract from this specimen was also extensively fractionated by partition column chromatography, and no biological activity as detected by the Na K method (Simpson and Tait 1952) was found in any fraction except those expected to contain aldosterone. At the levels tested, aldosterone therefore accounted for at least 90% of the biological activity in this extract."

The results of the assay of the pooled specimen were not available until after operation, so the information obtained from this line of approach at that time was that an excess of aldosterone was not present in the blood or urine. It nevertheless seemed necessary to try to demonstrate an adrenal tumour anatomically.

Anatomical study.—No adrenal tumour was palpable, and plain radiography and intravenous pyelography showed no abnormality except poor concentration of the dye; the kidneys were of normal size. After presacral insufflation with oxygen (Dr. Bryan Williams) plain radiographs, although they showed the renal and splenic outlines clearly, failed to reveal an adrenal tumour; but tomograms showed at the apex of the right adrenal a superimposed shadow, almost perfectly round and about 2·5 cm. in diameter (fig. 2).

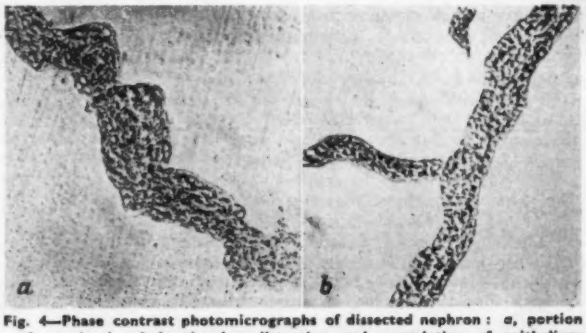

Fig. 4—Phase contrast photomicrographs of dissected nephron: *a*, portion of proximal tubule showing distortion and vacuolation of epithelium (×95); *b*, portion of the distal tubule showing that the outline and arrangement of the tubule is norm[illegible]; some increased vacuolation of the epithelium is seen (×64).

Operation

On June 10 the right adrenal was exposed by Mr. D. B. E. Foster. A friable yellow tumour of the size and position suggested radiographically was found and removed together with the whole of the right adrenal gland. Renal and muscle biopsies were also taken; the kidney did not look abnormal.

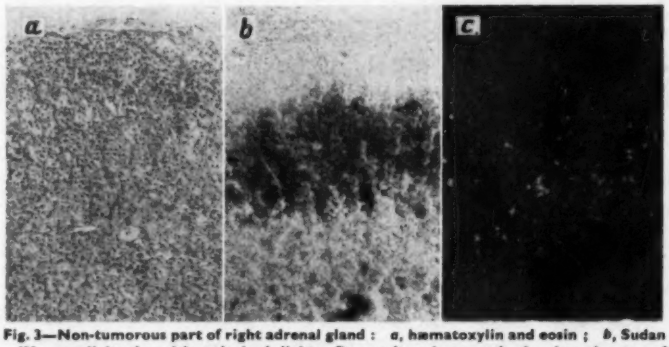

Fig. 3—Non-tumorous part of right adrenal gland: *a*, hæmatoxylin and eosin; *b*, Sudan IV; *c*, digitonin with polarised light. Composite photograph showing absence of sudanophilic and birefringent material from zona glomerulosa, and abundant sudanophilic material in zona fasciculata. (×65.)

Pathological Reports

Dr. H. J. Whiteley reported as follows: "The *adrenal tumour* was well encapsulated, the cut surface being a uniform golden-yellow. Microscopically the tumour was a well differentiated cortical adenoma, showing areas of secretory activity. The rest of the adrenal was small, the cortex being 0·4 mm. thick (normal 1–1·5 mm.). The cells of the zona glomerulosa were small, and contained scanty sudanophilic droplets and no birefringent material. The zona fasciculata was narrow, the cells containing abundant large sudanophilic droplets and some birefringent material. The zona reticularis contained a small amount of sudanophilic material (fig. 3). These findings suggest that in the non-tumourous portion of the right adrenal (the left was not examined) the zona glomerulosa was secreting, and that the zona fasciculata was atrophic and non-secreting."

Section of the kidney (Dr. A. G. Heppleston) showed hypertensive nephrosclerosis with great thickening of the arteries; there was no fibrinoid necrosis. Some vacuolation of the tubular epithelium was seen; in order to discover how this vacuolation was distributed in the tubule the biopsy specimen was investigated by the technique of *nephron dissection* by Dr. E. M. Darmady and Miss F. Stranack, who reported as follows: "microdissection of a portion of biopsy material was carried out by the technique previously described (Oliver 1939, Darmady and Stranack 1954). On superficial examination the total number of nephrons appeared to be normal, and interstitial fibrosis was slight or absent. On tracing the nephron the outline of the glomerulus was found to be normal. (By this technique accurate assessment of the glomerular structure cannot be made.) The proximal tubule, however, was abnormal, in that its epithelium was unusually translucent and the tubule was distorted, with areas in which the cells were large and vacuolated and the epithelium heaped up (fig. 4*a*). When the nephrons were traced lower minimal changes of a similar nature were found in some of the distal tubules, while others, in which the general outline and mucosal pattern were normal, showed some increased vacuolation of the epithelium. The collecting tubules were normal (fig. 4*b*). The striking feature was the localised vacuolation and distortion of the proximal tubule; it is unusual to find changes in the proximal tubule alone without gross lesions lower in the nephron. Precise localisation of the lesion may suggest that this is the site of control of acid-base balance.

Postoperative Progress

The operation itself was uneventful. By the third day after operation moderate lumbar œdema had developed, but this subsided over the next few days. The only subjective change caused by the operation was the abolition of the thirst and polyuria. The average urine volume during eleven days in April, 1955, was 2340 ml. per day, and during thirty days after operation 1438 ml. (The maximum specific gravity, however, was still only 1·012 ten weeks after operation.)

The effect of operation on the *blood-pressure* is shown in fig. 5, which compares the levels during the admission before operation with those during convalescence. During the patient's stay in hospital for investigation her blood-pressure tended to fall and the pulsus alternans disappeared, but the blood-pressure two days before operation was 205/130 mm.

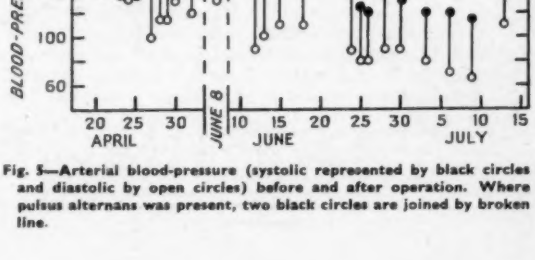

Fig. 5—Arterial blood-pressure (systolic represented by black circles and diastolic by open circles) before and after operation. Where pulsus alternans was present, two black circles are joined by broken line.

TABLE II—RENAL CLEARANCES (EACH THE MEAN OF THREE PERIODS)

Date	Inulin (ml. per min.)	p-aminohippurate (ml. per min.)	Filtration fraction	Potassium/inulin ratio
Before operation:				
June 14, 1954 ..	44·5	220	0·20	1·16
May 16, 1955 ..	49·2	267	0·184	..
After operation:				
July 12, 1955 ..	29·0	156	0·19	0·4

Hg. There was a gap in the preoperative observations because she spent some days at home. During the operation there were no large variations in blood-pressure, although it rose slightly while the adrenal was being handled. Two days later the pressure was 160/90 mm. Hg, and it fell further as time passed (fig. 5). More recently higher readings have been obtained; the pressure at her latest follow-up visit, on Oct. 20, was 156/110 mm. Hg. A radiograph of the chest thirty-one days after operation showed a reduction in the size of the heart and aortic knuckle: the transverse diameter of the heart shadow twenty-two days before operation was 145 mm., and thirty-one days after operation 130 mm.

Heat elimination from the hand, at complete release of vasoconstrictor tone achieved by warming, was measured in the right hand on two separate occasions before operation by a modification of the method described by Stewart (1911). The determination was repeated in the same hand under the same conditions after operation. The heat elimination was normal preoperatively, and did not fall significantly despite the fall in blood-pressure.

The *renal clearances of inulin and p-aminohippurate* were measured on two occasions before operation and again thirty-two days afterwards (table II). The first two readings, which agree well, show subnormal function. The postoperative determinations show much deterioration, which is reflected also in the serum-urea level, which was 68 mg. per 100 ml. at this time, and which remained at about this level three months after operation. The lowering of the clearances is approximately proportional to the lowering of the blood-pressure.

The preoperative *clearance of potassium* exceeded that of inulin, although the concentration of potassium in the serum was only 1·9 m.eq. per litre. From this finding, and because of the continued suppression of hydrogen-ion excretion, tubular hypersecretion of potassium was presumed to be occurring. After operation the ratio of the potassium clearance to the inulin clearance fell to 0·4 and the urine became acid (random pH 5·6).

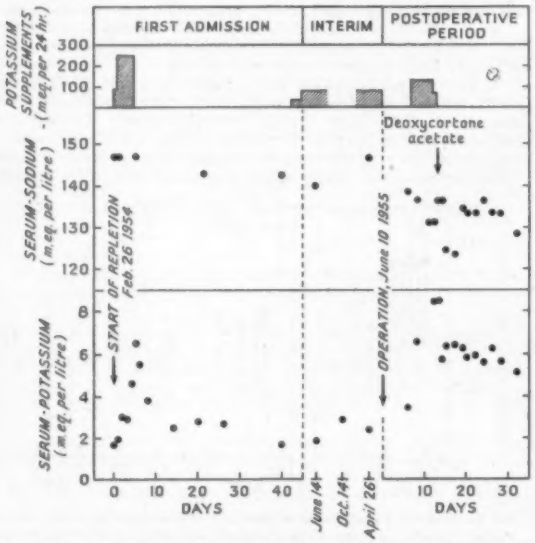

Fig. 6—Levels of sodium and potassium in serum throughout period of treatment.

The *salivary sodium/potassium ratio* rose greatly after operation (fig. 1). To show that the difference is not due to an increase in salivary flow (Garrod et al. 1955) the ratios have been plotted against rates of flow.

The levels of *sodium and potassium in serum* during the whole period of treatment are shown in fig. 6. Four of the seven preoperative sodium values are unusually high (147 m.eq. per litre). The fourteen values since operation were between 124 and 139 m.eq. per litre. The preoperative potassium concentration, initially low, rose rapidly to a high level (6·5 m.eq. per litre) on a potassium supplement of 250 m.eq. per day. On a normal diet without supplement it fell to the previous level after thirty-five days, and was maintained between 1·9 and 2·9 m.eq. per litre on a supplement of 80 m.eq. daily. After operation the level rose to 6·5, and, when potassium was added to the diet, to 8·5 m.eq. per litre. At this point 5 mg. of deoxycortone acetate was given. The level has since remained between 6·5 and 5·2 m.eq. per litre without supplement.

The *serum-chloride* level was normal throughout, except on the fifteenth postoperative day when it fell to 94 m.eq.

TABLE III—RESULTS OF ISOTOPE DILUTION

Date	Body-wt (kg.)	Exchangeable Na		Exchangeable K		Remarks
		m.eq.	m.eq. per kg.	m.eq.	m.eq. per kg.	
March 10, 1954	45·4	2150	47·4	1785	39·3	After repletion
April 7, 1954	44·6	2409	54·0	1441	32·3	After further depletion
June 15, 1954	50·0	2065	41·3	1608	32·2	On supplement
May 18, 1955	55·9	..	..	1655	29·6	On supplement
May 20, 1955	55·9	2600	46·5	..	..	..
June 10, 1955	..	..	..	..	..	Operation
July 6, 1955	55·0	..	..	2088	38·0	..
July 8, 1955	55·0	1893	34·4	..	..	..

per litre, in keeping with the low sodium level at that time. The serum level of *total carbon dioxide* was usually normal; but one value of 32 m.mol. per litre was observed, and on another occasion the pH of a sample of arterial blood was 7·47.

The amount of *electrolyte in the tissues* was determined by three methods: isotope dilution, analysis of muscle, and measurement of the electrolyte balance. The total exchangeable sodium and potassium were determined, usually simultaneously, by a modification of the method of James et al. (1954). The results (table III) are expressed both absolutely and in relation to body-weight. Increases in body-sodium were accompanied by decreases in body-potassium, and vice versa. The first determination, made after the initial repletion with large amounts of potassium, gave values which were within normal limits, although, because of variations in the total mass of muscle and fat, these limits are wide and difficult to define. Thereafter, until operation, the content of potassium was low; the content of sodium on April 7, 1954, when the patient had been without a potassium supplement for some weeks, was above normal. After operation the most obvious change was a fall in the sodium content of 707 m.eq. from the last preoperative figure, the potassium content having increased by 433 m.eq. in the same time. These changes are consistent with the hypothesis that the tumour was exerting a salt-retaining, potassium-losing effect.

Also consistent with this hypothesis are the results (table IV) of analysis of the specimen of muscle removed at operation. Normal values (Mokotoff et al. 1952) are given for comparison.

Balance measurements were made during two phases of the patient's illness: first, from the time of admission until eighteen days later (during the first six days of this period large doses of potassium were given); and second, during the thirty days immediately after removal of the tumour. In the first period there was a net gain of potassium of 767 m.eq. during the six days for which it was administered; when the supplement was stopped about 200 m.eq. was lost before approximate equilibrium was established. Sodium was lost in excess of chloride during the phase of potassium-loading; later both sodium and chloride were retained. On the assumption that chloride did not enter or leave cells, intracellular sodium decreased by 500 m.eq. while intracellular potassium increased by 639 m.eq. over the eighteen-day period. Potassium entered the cells rapidly, but sodium was discharged

TABLE IV—RESULTS OF ANALYSIS OF MUSCLE REMOVED AT OPERATION (M.EQ. PER KG. OF FAT-FREE DRY MUSCLE)

—	Potassium	Sodium	Chloride
Present case ..	386	215	87
Normal*	435–481	114–119	66–71

* Mokotoff et al. 1952.

relatively slowly at first. There was a remarkable coincidence between the calculated increase of intracellular sodium plus potassium and the clinical manifestation of tetany (fig. 7) (cf. Fourman 1954).

During the postoperative period the balance measurements show an apparent gain, over thirty days, of 260 m.eq. of sodium, 764 m.eq. of chloride, and 610 m.eq. of potassium. These figures are surprising in view of the results of isotope dilution (table III), which showed a loss of 707 m.eq. of sodium. The gain of 433 m.eq. of potassium found by this method agrees well enough with that found by the balance method. The postoperative isotope determination coincided with the end of the balance period, but the preoperative determination was made three weeks before operation, so exact concordance is not to be expected. A more important probable cause of the discrepancy is the occurrence of unmeasured losses of sodium in sweat during the balance measurement, which was made during unusually hot weather. These losses may be large enough to account for the different results obtained by the two techniques. Wilson et al. (1954) compared the results of balance measurements with those of two isotope measurements. In the case of sodium, in all instances where the discrepancies were large the balance method showed the greater gain; discrepancies up to 259 m.eq. per week were observed, and were attributed to unmeasured extrarenal loss of sodium. The daily errors added together for the whole period of thirty days make the cumulative balance figures untrustworthy, but the balance study provides reliable information about electrolyte gains and losses over short periods. In particular it shows that there was not a sudden large loss of sodium after removal of the tumour; during the first five days after operation balance showed an apparent gain of 221 m.eq. of sodium. While this gain may have been overestimated because of extrarenal loss, the existence of sodium

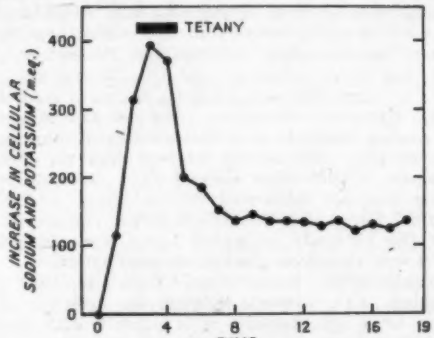

Fig. 7—Calculated increase in cellular sodium plus potassium correlated with appearance of tetany.

retention is corroborated by the appearance of œdema at this time.

Discussion

Our patient resembles in many respects that of Conn (1955a and b). Both presented with potassium depletion due to excessive renal loss which was abolished by removal of an adrenocortical tumour. Both had hypernatræmia, thirst, and polyuria, and these also were abolished. Both had hypertension, but this was severe only in our patient. In both the salivary sodium/potassium ratio was depressed, and this ratio increased after operation. Conn's hypothesis that the syndrome is caused by excessive secretion of salt-retaining hormone was confirmed in his case by the presence of large amounts of this hormone in the urine and in the tumour itself.

There are, however, several differences between Conn's patient and ours. In the first place it has not been possible to demonstrate more than a small increase in the urinary excretion of aldosterone. In the second place, our patient did not lose a large amount of sodium immediately after operation; on the contrary she became œdematous on the third day. This difference may be accounted for in several ways. Conn's patient received an infusion of hydrocortisone during and just after operation, which may have promoted a sodium diuresis. In our patient the potassium supplement was discontinued at the time of operation, and we have demonstrated that this might lead to sodium retention. Another possibility is that the fall in blood-pressure, much greater in our patient, might have reduced her glomerular-filtration rate enough to limit her capacity to excrete sodium. At all events, in retaining sodium she was responding normally to an operation. This response does not seem to depend on any increase in the secretion of adrenocortical hormone (Mason 1955).

We would also like to draw attention to the almost complete absence of alkalosis, in marked contrast to Conn's case. Among other cases of proved or presumed primary aldosteronism, one had no alkalosis (Earle et al. 1951), while others did (Evans and Milne 1954, Mader and Iseri 1954). Our patient had tetany only during repletion with large amounts of potassium, when there was evidence of an increase in intracellular cation.

Before the tumour was removed it was uncertain whether the blood-pressure would fall subsequently. It seemed possible that the hypertension was caused either by renal damage or by a hormone secreted by the tumour. On the latter hypothesis, the pressor effect might have been exerted either directly or through the disturbance in body content and distribution of electrolyte. The satisfactory fall in blood-pressure which, in the event, followed operation has not enabled a firm choice to be made between these possibilities. Removal of the tumour has lowered the output of aldosterone to a subnormal level, and converted a salt plethora at least transiently into a salt depletion, with low serum-sodium level and a low total exchangeable sodium (34·6 m.eq. per kg.). Such changes might lower the blood-pressure in hypertension due to any cause, including renal damage. On the other hand the serum-sodium level has since returned to normal, while the blood-pressure remains well below preoperative levels. The observed facts would, however, be consistent with the hypothesis that the hypertension was due to a hormone secreted by the tumour.

As between the possibilities that the hormone caused hypertension directly, or indirectly through electrolyte disturbance, we can only say that the blood-pressure fell, not immediately after removal of the tumour, but during several days. Also, our observations on heat elimination from the hand did not resemble those reported in phæochromocytoma (Hamilton et al. 1953), where the hypertension is undoubtedly caused directly by a circulating hormone. If the hypertension was caused through electrolyte disturbance the hormone responsible was probably aldosterone itself, since this steroid accounted for 95% of the biological activity in the mineralocorticoid assay. While suggesting that aldosterone caused the hypertension by producing a salt plethora, we feel obliged to mention that there is, as yet, no direct evidence that this hormone will produce hypertension in the same manner as deoxycortone acetate and other corticoids (Gaunt 1955).

A disturbing consequence of the fall in blood-pressure has been the reduction in renal plasma-flow and glomerular-filtration rate, resulting in nitrogen retention.† These reductions, being proportional to the fall in blood-

† Because of the fall in renal clearances after operation, interpretation of the urinary steroid values is difficult; but, compared with the last values obtained before operation, urinary excretion of cortisol has been reduced by a factor of 2·5, whereas the corresponding factor for aldosterone is 25.

pressure, are presumably due to a fall in perfusion pressure, the vascular resistance of the kidney remaining unchanged. The clearances behave similarly during reduction of the blood-pressure by various drugs (Freis et al. 1953). Thorn et al. (1952) found such changes after sustained falls in the blood-pressure of hypertensives brought about by total adrenalectomy; the reduction in glomerular-filtration rate and renal blood-flow was greatest in those patients whose blood-pressures were lowered the most.

It is now well known that chronic potassium depletion can lead to a characteristic nephropathy, in which vacuolation and degeneration of tubular epithelium are associated with impaired capacity for urinary concentration and acidification, and with lowered glomerular-filtration rate and *p*-aminohippurate clearance (Schwartz and Relman 1953, Relman and Schwartz 1955). All these features were present in some degree in our patient, although the impairment of acidification was slight (cf. Clarke et al. 1955). The results of nephron dissection show that the structural changes were almost confined to the proximal tubule. In some of Schwartz and Relman's cases slow recovery followed repair of the potassium deficit.

Summary

A patient with recurrent paralysis due to excessive urinary loss of potassium, and with hypertension, is described.

Alkalosis was slight or (more often) absent. Urinary concentrating power was lost, but the capacity for urinary acidification was only slightly impaired.

A tumour of the right adrenal gland was demonstrated radiographically, and its removal reversed the electrolyte abnormality and lowered the blood-pressure.

Urinary excretion of aldosterone was normal or only slightly increased, but fell after operation. Blood-aldosterone levels were within normal limits.

Renal biopsy showed vacuolation of the tubular epithelium almost entirely confined to the proximal tubule, with minimal changes in the distal tubule.

Isotope dilution and muscle analysis showed that the patient's tissues contained more sodium and less potassium than normal; operation ultimately reversed these changes, but balance data showed that sodium retention occurred for a short time after operation.

Renal clearances of inulin and *p*-aminohippurate, initially low, were further reduced after operation, approximately in proportion to the reduction of blood-pressure.

We are much indebted to those colleagues named in the text, and to Dr. O. Garrod, who have been concerned in the investigation or treatment of this patient, and who have allowed us to quote their findings. We also acknowledge gratefully the help of Dr. Paul Fourman and the technical assistance of Mr. Emlyn Morgan. One of us (M. G. F.) held a Cardiff Royal Infirmary research fellowship in medicine.

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PLASMA FIBRINOLYTIC ACTIVITY IN CIRRHOSIS OF THE LIVER

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A PROTEOLYTIC enzyme is present in normal blood in the form of an inactive precursor, plasminogen, which is associated with the globulin fraction. An inhibitor, antiplasmin, is present in excess in the albumin fraction. Plasmin activity can be produced by streptokinase, which activates plasminogen; by chloroform, which destroys antiplasmin; and by techniques such as fractionation of the plasma which separates the plasmin-antiplasmin complex (Macfarlane and Biggs 1948). Plasmin not only produces fibrinolysis but also digests plasma-proteins (including fibrinogen), casein, and gelatin.

Goodpasture (1914) first reported spontaneous fibrinolysis in cirrhosis of the liver: the clotted plasma obtained from 3 cases liquefied when incubated at 37°C for sixteen hours. He added a 4th case, but in this the plasma was obtained after death. In contrast he found that the blood-clots of healthy controls remained unlysed for many days.

Since then spontaneous fibrinolysis has been found in various diseases. It has been observed in patients who have undergone surgical operations (Macfarlane 1937), and according to Ratnoff (1952) Fantl and Simon described its occurrence during electric-shock therapy. It has been induced in healthy people by the injection of adrenaline and by severe exercise (Biggs et al. 1947).

It has been assumed in the past that spontaneous or induced fibrinolytic activity in the plasma was due to plasmin, but according to Biggs and Macfarlane (1953) Fantl and Simon showed that the fibrinolysin found in the blood of rats subjected to electrical convulsions had no effect on fibrinogen. Bidwell and Macfarlane (1951) noted similarly that the fibrinolysin found in the blood of man after severe exercise had no effect on fibrinogen. They also showed that this fibrinolytic activity was not influenced by the serum inhibitor of plasmin. Biggs and Macfarlane (1953) considered that either the naturally activated factor was not plasmin or, if it was, its action was considerably modified.

Uncontrollable hæmorrhage from multiple sites associated with extreme fibrinolytic activity of the plasma after splenectomy in a patient with cirrhosis of the liver directed our attention to this problem. We report here our observations on the incidence and intensity of spontaneous fibrinolytic activity of the plasma in cirrhosis of the liver and the influence of surgical trauma thereon.

Material and Methods

Observations were made on 30 consecutive cases of cirrhosis of the liver, and on 12 consecutive cases of

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primary carcinoma arising in cirrhotic livers, in patients admitted to the university medical unit, Queen Mary Hospital. In each case the diagnosis was established by aspiration biopsy. The healthy controls were medical undergraduates.

Fibrinolytic activity was determined by the quantitative technique described by Biggs and Macfarlane (1953). The initial level of fibrin was taken as that estimated thirty minutes after the addition of thrombin, and the duration of incubation was arbitrarily selected as six, twelve, and twenty-four hours. To ascertain whether the fibrinolysin also destroyed fibrinogen, duplicate sets of tubes were set up containing the same quantities of citrated plasma and buffered saline solution, but the thrombin was added after incubation for six, twelve, and twenty-four hours, and thirty minutes later the fibrin contents were estimated. To determine whether clotting was necessary to activate the fibrinolysin, washed fine fibrin webs, formed on roughened glass rods, were immersed in specimens of undiluted plasma showing active fibrinolysis. These webs were formed by adding thrombin to a 1/25 dilution of normal plasma in veronal-acetate buffered saline solution of pH 7·4.

Results

The fibrinolytic activity of the plasma in the 30 cases of cirrhosis is set out in table I. From this it will be seen that fibrinolysis was complete in 7 cases in less than six hours, in 9 between six and twelve hours, and in 5 between twelve and twenty-four hours. In the remaining 9 at the end of twenty-four hours a variable but reduced quantity of fibrin remained, representing a loss of 24–67% of the initial amount (average 41%). The average reductions in fibrin content in these 30 cases are set out graphically in fig. 1 in which they are contrasted with those of 20 healthy controls. In the controls the reduction in the fibrin content after incubation for twenty-four hours was 0–32% (average 13%).

No relationship could be demonstrated between the intensity of the fibrinolysis and the severity of the disease assessed clinically either by tests of liver function or by the appearances on aspiration biopsy. Indeed, cases 26 and 27 with limited fibrinolytic activity were adjudged among the most seriously ill. There was no correlation with the presence or absence of ascites or with the plasma-albumin and plasma-globulin levels. All the patients had gross splenomegaly with pancytopenic hypersplenism.

TABLE I—SPONTANEOUS FIBRINOLYTIC ACTIVITY OF PLASMA IN 30 CASES OF CIRRHOSIS OF LIVER

Case no.	Duration of incubation (hr.)						
	½	6		12		24	
	Fibrin (mg. per 100 ml.)	Fibrin		Fibrin		Fibrin	
		mg. per 100 ml.	% lysed	mg. per 100 ml.	% lysed	mg. per 100 ml.	% lysed
1	112	0	100				
2	139	0	100				
3	289	0	100				
4	166	0	100				
5	455	0	100				
6	320	0	100				
7	264	0	100				
8	182	70	61	0	100		
9	251	109	57	0	100		
10	321	45	86	0	100		
11	182	90	51	0	100		
12	578	216	63	0	100		
13	214	16	93	0	100		
14	385	70	82	0	100		
15	278	90	67	0	100		
16	321	114	65	0	100		
17	209	109	48	32	85	0	100
18	353	288	19	69	81	0	100
19	312	171	45	70	78	0	100
20	281	134	52	70	75	0	100
21	181	128	29	80	56	0	100
22	123	86	30	70	43	43	65
23	571	353	39	316	55	187	67
24	273	193	29	*		182	33
25	363	*		307	15	273	25
26	307	203	34	193	37	171	44
27	187	139	26	*		128	32
28	251	128	49	128	49	123	51
29	272	232	15	214	21	200	26
30	342	288	16	280	18	259	24

* Not done.

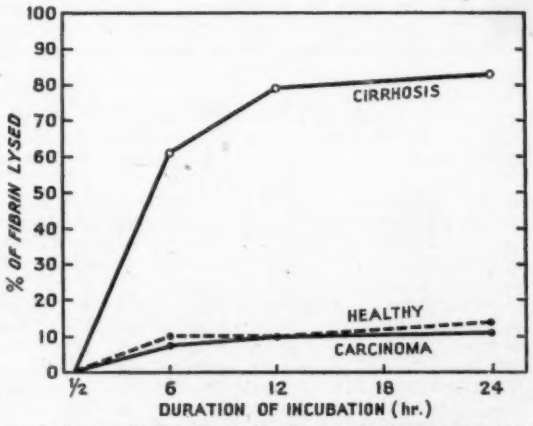

Fig. 1—Average fibrinolytic activity of plasma in 30 cases of cirrhosis of liver, 12 cases of primary carcinoma of liver, and 20 healthy controls.

The disappearance of ascites with treatment exerted no influence on the intensity of the fibrinolysis, nor did clinical improvement in the patients' condition. Repeated observations in 10 cases for from one to three months showed decreased fibrinolytic activity in 3; the clinical condition in 1 had deteriorated, whereas in the remaining 2 there was little change.

The incubation, even for twenty-four hours, of unclotted plasma from each case did not reduce the fibrinogen content. Fine fibrin webs, prepared as described above, lysed when immersed in specimens of undiluted plasma showing active fibrinolysis.

The average reductions in fibrin content in the 12 cases of primary carcinoma, each of which arose in a cirrhotic liver, are set out in fig. 1. After incubation for twenty-four hours the reduction in fibrin content was 0–30% (average 12%). The initial levels of fibrin were 272–722 mg. per 100 ml. (average 466 mg. per 100 ml.).

6 patients with cirrhosis (cases 3, 4, 9, 21, 29, and 30) had undergone splenectomy under general anæsthesia to correct the associated pancytopenia, and fibrinolytic activity was determined at intervals during and after the operation. The results are set out in table II. Specimens of blood taken fifteen minutes after removal of the spleen in each case showed an intensification of fibrinolytic activity. This increase was well marked except in case 29.

In case 3 no clot formed on the addition of thrombin to diluted plasma; so the fibrinolytic activity was estimated on undiluted plasma, and lysis was complete in all the tubes when first inspected after thirty minutes. In this case whole blood clotted in fifteen minutes but was fluid again within thirty seconds.

Cases 3, 21, 29, and 30 were investigated four hours after splenectomy, when the fibrinolytic activity was found to have reverted to the preoperative level in each case.

In the 4 patients showing active fibrinolysis preoperatively (cases 3, 4, 9, and 21), the plasma twenty-four hours after splenectomy showed well-marked reduction in activity. Though not recorded here this reduction was found to persist for seven to twenty-one days. 3 of these patients (cases 3, 4, and 9) were reinvestigated a month after operation, when the fibrinolysis was found to have returned to its preoperative intensity.

TABLE II—INFLUENCE OF SPLENECTOMY ON FIBRINOLYTIC ACTIVITY OF PLASMA IN 6 CASES OF CIRRHOSIS OF LIVER
(Operation specimen obtained fifteen minutes after removal of spleen)

Case no.	Sample	Fibrin (mg. per 100 ml.) after incubation for ½–24 hr.			
		½	6	12	24
3	Initial	289	0		
	Operation	0*			
	4 hours	189	24	0	
	24 hours	259	208	181	165
	1 month	455	0		
4	Initial	166	0		
	Operation	160	0†		
	24 hours	498	498	461	423
	1 month	197	0		
9	Initial	251	109	0	
	Operation	294	0†		
	24 hours	267	182	192	188
	1 month	288	128	0	
21	Initial	181	128	80	0
	Operation	246	0†		
	4 hours	181	139	112	0
	24 hours	259	117	‡	69
29	Initial	272	232	214	200
	Operation	230	58	42	0
	4 hours	203	192	‡	‡
	24 hours	460	423	411	411
30	Initial	342	288	280	259
	Operation	85	0†		
	4 hours	133	128	128	128
	24 hours	353	321	307	280

* Test done on undiluted plasma. A firm clot formed on the addition of thrombin.
† Fibrinolysis complete in less than three hours.
‡ Not done.

6 of the patients with cirrhosis showing low spontaneous fibrinolytic activity (cases 24 and 26–30) were each given 1 ml. of 1/1000 adrenaline hydrochloride subcutaneously. The fibrinolytic activity of the plasma from specimens of blood obtained ten, twenty, forty, sixty, ninety, and a hundred and twenty minutes after the injection was estimated. In all 6 cases the fibrinolytic activity was intensified, reaching its maximum within twenty minutes. The findings at this time are set out in table III. In case 26 multiple petechiæ developed in the skin during the test.

Fig. 2 contrasts the average findings twenty minutes after the injection of adrenaline in these 6 cases with those in 6 healthy controls. From this figure it will be seen that, even when the existence of spontaneous fibrinolysis is allowed for, the response of the patients with cirrhosis was significantly greater. The duration of this action of adrenaline was much longer in the patients with cirrhosis than in the healthy controls. Fig. 3 contrasts the duration of effect in the control showing the most active fibrinolytic response to adrenaline with that of case 26, which is representative of the cirrhotic group.

TABLE III—EFFECT OF SUBCUTANEOUS 1/1000 ADRENALINE HYDROCHLORIDE ON FIBRINOLYTIC ACTIVITY OF PLASMA IN 6 CASES OF CIRRHOSIS OF LIVER WITH LIMITED SPONTANEOUS FIBRINOLYTIC ACTIVITY

Case no.	Time	Fibrin (mg. per 100 ml.) after incubation for ½–24 hr.			
		½	6	12	24
24	B	273	193	†	182
	A	256	0*		
26	B	307	203	193	171
	A	295	0*		
27	B	187	139	†	128
	A	133	64	0	
28	B	251	128	128	123
	A	272	85	0	
29	B	272	232	214	200
	A	280	85	0	
30	B	342	288	280	259
	A	272	0*		

B = Before adrenaline.
A = 20 minutes after adrenaline.
* Fibrinolysis complete in less than three hours.
† = Not done.

Cases 2 and 17 were given daily for five days 10 mg. of corticotrophin by slow intravenous drip. The results are set out in table IV. It will be seen that in both cases there was significant reduction in fibrinolytic activity by the fifth day. Six days later it had returned to its previous level. Case 31 (see table IV) was first seen on the seventh day of treatment with corticotrophin 120 mg. intramuscularly daily, when portal-vein thrombosis had developed. The fibrinolytic activity of the plasma was negligible, but four weeks later fibrinolysis was complete in less than six hours.

Discussion

No influence on fibrinogen was observed in the plasmas showing spontaneous fibrinolytic activity or when this latter was increased by adrenaline or during operation. One of us (H.C.K.) has made further observations which show that the fibrinolysin does not act on prothrombin, gelatin, or casein and is unaffected by the serum inhibitor of plasmin. It must be concluded that the fibrinolysin found in cirrhosis of the liver is not plasmin. It is present in the plasma in active form and is apparently similar to the cadaveric fibrinolysin described by Mole (1948).

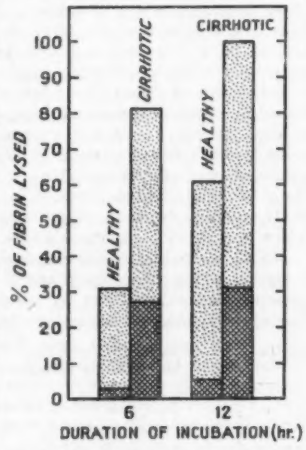

Fig. 2—Mean fibrinolytic activity of plasma before and after subcutaneous injection of 1 ml. of 1/1000 solution of adrenaline hydrochloride in 6 cases of cirrhosis of liver and in 6 healthy controls: *hatched*, before adrenaline; *stippled*, increase after adrenaline.

Ratnoff (1949), who studied fibrinolysis in 28 cases of cirrhosis of the liver, reported that in 11 of them clotted plasma was lysed within twenty-four hours, and in 15 of the remaining 17 cases between twenty-four and forty-eight hours. Marrazza et al. (1954) found that 5 of 23 cases of cirrhosis of the liver showed complete lysis in twenty-four hours, 15 in forty-eight hours, and the remaining 3 in seventy-two hours. Both Ratnoff (1949) and Marrazza et al. (1954) used recalcified whole plasma; but, as shown by Macfarlane (1937), diluted plasma (used in the present cases) is more sensitive. Therefore no comparison of the intensity of activity can be made between these three series. It should be noted, however, that our experience is that the fibrin formed by the addition of thrombin is more resistant to fibrinolysis than is that formed by recalcification of citrated plasma.

Marrazza et al. (1954) concluded that there was a direct relationship between the intensity of the fibrinolytic activity and the severity of the liver lesion. Ratnoff (1949) followed the clot-lysis time in 6 of his patients as they improved. In 2 of these, clinically milder cases than the others, the clot-lysis time lengthened, but in the remaining 4 clinical improvement was unaccompanied by any change in the clot-lysis time. In the present series no relationship existed between the severity of the disease as adjudged clinically, by liver-

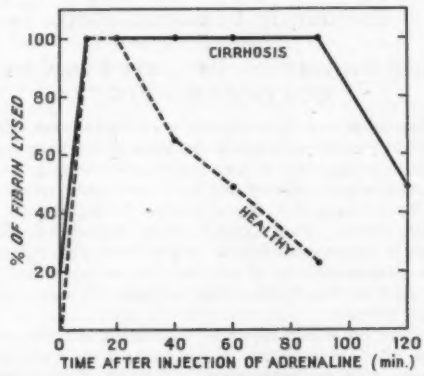

Fig. 3—Duration of effect of subcutaneous injection of 1 ml. of 1/1000 solution of adrenaline hydrochloride in representative case of cirrhosis of liver and in most intense and prolonged response observed in 6 controls, after 12 hours' incubation.

function tests, or by the appearances on liver biopsy. Further evidence that no relationship exists between overall impairment of liver function and the occurrence of fibrinolysis is afforded by the findings in the cases of primary carcinoma in a cirrhotic liver, since in all these cases liver function was grossly disturbed. Ascitic fluid in cirrhosis of the liver is fibrinolytic, but there was no correlation between plasma activity and the presence of ascites. The resolution of ascites with treatment produced no influence on fibrinolysis; nor did clinical improvement in the patient's condition.

The production of fibrinolysis by operation on patients with apparently normal livers is variable. Macfarlane (1937) recorded an incidence of 70% and Imperati (1937) 50%. Each of the 6 patients with cirrhosis subjected to splenectomy showed intensification of the pre-existing fibrinolytic activity. Further the intensity of the fibrinolysis resulting, even allowing for the existence of a preoperative level, was significantly greater than any observed by us after various operations, including splenectomy, on patients with normal livers. In view of the variability of the effect of operation on patients with normal livers we do not consider any such controls satisfactory. This difficulty does not arise with the response to the subcutaneous injection of adrenaline, since Biggs et al. (1947) have shown that this invariably induces fibrinolytic activity in healthy people. The response of the patients with cirrhosis to the subcutaneous injection of adrenaline, even when the presence of spontaneous fibrinolytic activity is allowed for, was not only of significantly greater intensity than that of the healthy controls but also of significantly longer duration. It may well be that further experience with the adrenaline test will show that the results thereof mirror the effects of operation and will permit the detection of those cases of cirrhosis in which fibrinolysis may become of such intensity as to play a part in the production of the hæmorrhage referred to above. The development of multiple petechiæ in case 26 after the injection of adrenaline supports this view.

TABLE IV—INFLUENCE OF CORTICOTROPHIN ON SPONTANEOUS FIBRINOLYTIC ACTIVITY OF PLASMA IN 3 CASES OF CIRRHOSIS OF LIVER

Case no.	Sample	Fibrin (mg. per 100 ml.) after incubation for ½–24 hr.			
		½	6	12	24
2	Initial	139	0		
	Fifth day of corticotrophin 10 mg. i.v. daily	203	†	203	186
	Six days later	176	0		
17	Initial	209	109	32	0
	Fifth day of corticotrophin 10 mg. i.v. daily	289	251	241	180
	Six days later	228	82	0	
31	Seventh day of corticotrophin 120 mg. i.m. daily*	256	232	224	212
	A month later	181	0		

* = Day of development of portal vein thrombosis.
† = Not done.

The intensification of fibrinolytic activity, which is one of the immediate results of operation, appears to pass off in four hours, and it is within this period that there is risk of hæmorrhage of the type previously referred to. Within twenty-four hours the spontaneously occurring fibrinolytic activity present preoperatively is inhibited, and this inhibition persists for from seven to twenty-one days. It seems that the initial shock phase is associated with increased fibrinolytic activity and the succeeding countershock phase with its abolition. The view that suprarenal cortical activity inhibits spontaneously occurring fibrinolysis is supported by the observations on the 3 patients given corticotrophin. In both cases 2 and 17 there was a significant reduction in fibrinolytic activity on the fifth day of treatment with corticotrophin. Six days after the corticotrophin had been stopped the fibrinolytic activity had returned to the pre-treatment level. Case 31 was first seen on the seventh day of treatment with corticotrophin 120 mg. intramuscularly daily, when evidence of portal-vein thrombosis had developed. The fibrinolytic activity of the plasma then was negligible, but four weeks later it was intense. Further support is obtained from the observations by Kwaan and McFadzean (1956), who have shown that the administration of corticotrophin will prevent the lysis of clots produced experimentally in the marginal vein of the ear of the rabbit—a lysis which presumably results from release of fibrinolysin. Truelove (1952) found that corticotrophin did not prevent the development of fibrinolysis after either exercise or adrenaline in volunteers, and we have confirmed his findings with adrenaline. His conclusion, however, that adrenocortical activity had no direct relationship to the phenomenon of fibrinolysis cannot apply to spontaneous fibrinolysis in cirrhosis of the liver.

Macfarlane and Biggs (1948) considered that the most obvious function of fibrinolysis was the proteolysis of pathological fibrin deposits, and Mole (1948) suggested that it might be the physiological means whereby fibrin deposits are prevented from forming on the vascular endothelium in health, especially if its source was, as he believed, the endothelium. Portal-vein thrombosis remains a hazard of splenectomy in cirrhosis of the liver and of the administration of corticotrophin in this disease. Eisenmenger et al. (1952) reported its occurrence in 3 patients so treated. In each there is inhibition of spontaneous fibrinolysis, and this may play a part in the development of such thrombosis.

The adverse effect of intense fibrinolysis on hæmostasis is manifest, yet it seems that such activity alone may not cause hæmorrhage. For example, in case 3 the clot formed spontaneously from whole blood obtained fifteen minutes after removal of the spleen lysed in thirty seconds, and the clot formed by the addition of thrombin to undiluted citrated plasma lysed in less than thirty minutes; yet clinically there was no bleeding. Again, in case 26, after the injection of adrenaline multiple petechial hæmorrhages appeared in the skin; yet equally intense fibrinolysis was provoked by adrenaline in other cases without the development of such hæmorrhages.

The mechanism of production of spontaneous fibrinolytic activity in cirrhosis of the liver remains obscure. Cirrhosis appears to be the only primary hepatic disease in which spontaneous fibrinolysis has so far been reported.

Ratnoff (1949) found that the clot-lysis time was three days or longer in 13 patients with infective hepatitis, 2 of whom were in hepatic coma, and in 6 patients with obstructive jaundice. By the same technique in 26 of 29 cases of cirrhosis he found that it was two days or less. The relative inactivity of the plasma in infective hepatitis has been confirmed by Marrazza et al. (1954).

The relative inactivity of the plasma in primary carcinoma is of interest, as are also the high levels of fibrinogen observed. Since each of the livers was cirrhotic, it seems reasonable to suggest that the development of the carcinoma had led to the disappearance of fibrinolytic activity from the plasma. Although the series is too small to warrant inclusion, evidence is accumulating which indicates that spontaneous fibrinolysis is inhibited in cirrhotic patients during intercurrent pyrexial illness and after gastro-intestinal bleeding.

Summary

A study of the fibrinolytic activity in the plasma of 30 cases of cirrhosis of the liver by the quantitative technique described by Biggs and MacFarlane (1953) is reported.

Fibrinolysis was complete in less than six hours in 7 cases, between six and twelve hours in 9, and between twelve and twenty-four hours in 5. In the remaining 9 cases there was a loss of 25–67% of the initial levels. The average reduction in fibrin content after incubation for twenty-four hours was 83%.

These findings are contrasted with those obtained in 12 cases of primary carcinoma arising in cirrhotic livers and in 20 healthy controls. In the former the average reduction in fibrin after incubation for twenty-four hours was 12%, and in the latter 13%.

No relationship was observed between the severity of the cirrhosis and the intensity of the fibrinolysis.

Splenectomy in 6 patients with cirrhosis caused immediate intensification of the fibrinolytic activity—an influence which passed off within four hours. It is in this period that there is risk of hæmorrhage associated with fibrinolysis. Within twenty-four hours of operation spontaneous fibrinolytic activity ceased.

The subcutaneous injection of adrenaline in 6 cases of cirrhosis led to increased fibrinolytic activity, which was on the average of greater intensity and of longer duration than that in healthy controls.

Corticotrophin administered to 2 of the cases showing active fibrinolysis led to a significant reduction in the fibrinolytic activity on the fifth day. It is concluded that suprarenal cortical activity depresses the spontaneous fibrinolytic activity of the plasma, and may play a part in the development of thrombosis of the portal vein observed postoperatively or during corticotrophin therapy in cirrhosis of the liver. The findings in 1 case of cirrhosis of the liver in which portal-vein thrombosis developed during the administration of corticotrophin are reported. At the time when the thrombosis developed, fibrinolytic activity was absent but a month later it was intense.

The fibrinolysin had no influence on fibrinogen, and it is concluded that it is not plasmin but is similar to cadaveric fibrinolysin described by Mole (1948).

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Preliminary Communication

THE INHIBITION OF CLOT LYSIS BY CORTICOTROPHIN

IN the course of observations on spontaneous fibrinolytic activity of the plasma in cirrhosis of the liver Kwaan et al.[1] have found that this activity ceased within twenty-four hours after splenectomy and remained absent for seven to twenty-one days before returning to pre-operative levels. They consider that suprarenal cortical activity in the countershock phase may be responsible for the disappearance of fibrinolytic activity and may play a part in the development of postoperative portal-vein thrombosis.

Eisenmenger et al.[2] reported 3 cases of cirrhosis of the liver in which portal-vein thrombosis developed during treatment with corticotrophin. Kwaan et al. observed one patient with cirrhosis of the liver who was first seen on the seventh day of treatment with intramuscular corticotrophin 120 mg. daily, when portal-vein thrombosis had developed. The fibrinolytic activity of the plasma was then negligible, but four weeks later it was intense. Kwaan et al. also reported a significant reduction in spontaneous fibrinolytic activity in 2 cases of cirrhosis of the liver on the fifth day of administration of corticotrophin.

These facts led us to investigate the influence of stimulation of the suprarenal cortex on the lysis of clots produced experimentally.

Methods

In each of 40 adult rabbits thrombosis of the marginal vein of one ear was produced by a minor modification of the technique reported by Grossi et al.[3] A length of the vein was isolated between two bulldog clamps and the medial tributaries occluded by a clamp applied parallel to the marginal vein. A 25-gauge needle was inserted, the vein emptied of blood, and 0·05 ml. of a solution of thrombin 500 units per ml. injected. The vein was allowed to fill by releasing the upper clamp, which was then reapplied. In all the rabbits a firm clot formed, and after fifteen minutes the clamps were removed.

For two days before production of the thrombosis and throughout the period of observation 26 of the rabbits were given intramuscular corticotrophin 10 units per kg. of body-weight daily, divided into 3 doses. The remaining 14 rabbits served as controls. The segments of the veins were examined at short intervals by transillumination and the lengths of clots measured. At the conclusion of the observations all were subjected to microscopy.

Result

In each of the control rabbits the clot disappeared and free flow through the vein was established in from twelve to thirty-nine hours (average twenty hours). Before it disappeared the clot became progressively shorter and free in the vein; thereafter it rapidly disappeared. A biopsy specimen of the vein was taken forty-eight hours after the production of thrombosis, and on histological examination there was no evidence of thrombus. In every case the vein appeared normal.

In 25 of the 26 rabbits treated with corticotrophin the thrombi persisted until the experiment was terminated by the removal of thrombosed segments for histological examination, which in 12 of them was carried out on the sixth day, and in the remaining 13 on the eighth day, after the production of thrombosis. In the exception, forty-eight hours after production the clot had shortened

1. Kwaan, H. C., McFadzean, A. J. S., Cook, J. *Lancet*, Jan. 21, 1956, p. 132.
2. Eisenmenger, W. J., Slater, R. J., Bongiovanni, A. M. *Amer. J. Med.* 1952, **13**, 27.
3. Grossi, C. E., Clifton, E. E., Cannamela, D. A. *Blood*, 1954, **9**, 310.

from 4½ to 3 cm. It was firm, but in the next eight hours it became loose in the vein and had further shortened to 1 cm. Six hours later no clot was discernible on transillumination, and on histological examination the vein appeared normal, with no evidence of thrombus. In the remaining 25 rabbits there was considerable but variable fluctuation in the length of the clot for the first seventy-two hours, but thereafter it remained stable. It lengthened (average 1·5 cm.) in 8 cases; it remained the same length in 12; and in 5 it shortened (average 1 cm.). On histological examination a well-formed thrombus was found in each vein. Strikingly in all sections evidence of organisation was minimal and, at most, was restricted to a small segment of the clot. In the majority the clot had retracted from part of the wall of the vein, forming a by-pass channel, and here the clot surface was covered by endothelium continuous with that of the vessel.

Discussion

As was pointed out by Jaques,[4] experimental venous thrombosis is difficult to produce in healthy animals. The method here reported may have an application in this field.

It appears reasonable to suggest that the clots in the veins of the control rabbits stimulated the production of fibrinolysin with consequent lysis of the clots, and that corticotrophin inhibited this production. This view supports the hypothesis advanced by Kwaan et al.[1] that suprarenal cortical activity was responsible for the post-operative disappearance of spontaneously occurring fibrinolysin from the plasma of patients with cirrhosis of the liver. They consider that the disappearance of fibrinolytic activity is a possible factor in the development of portal-vein thrombosis in cirrhosis of the liver after splenectomy or during corticotrophin therapy.

The inhibition of fibrinolysis may play a part in the genesis not only of postoperative venous thrombosis but also of atherosclerosis, because Duguid,[5] whose observations have been confirmed by Harrison,[6] Geiringer,[7] and Crawford and Levene,[8] holds that the initial phase of development of atherosclerosis is the occurrence of mural thrombi. Persistence of such thrombi leads to thickening of the intima, and subsequent fatty change produces the typical appearance of this lesion. The inhibition of fibrinolysis by suprarenal cortical activity may be a factor in determining the persistence of mural thrombi, and the observations reported here have a value in the experimental investigation of atherosclerosis.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Clinical Consequences of Cerebral Anoxia

THE neurological section met on Jan. 5, under the presidency of Dr. REDVERS IRONSIDE.

Dr. R. S. ALLISON (Belfast) referred to hypoxic reactions occurring in medical practice, the chief causes of which were cerebral circulatory failure, dehydration, barbiturate poisoning, and electrolytic imbalance. He described an instance of a patient with chronic duodenal ulcer who had been vomiting and taking alkaline powder regularly, and whose confused mental state was related to a fall in cerebral oxygen saturation. He emphasised that hypoxic effects in ill patients were often mistaken for hysteria. When the severity of anoxia was unknown and the patient was still unconscious when seen, it was difficult to forecast the prospects of survival; but repeated epileptiform fits and sweating were ominous signs, and, if the patient survived, irreversible damage to the nervous system might result in a partial decerebrate state.

The principal neurological sequelæ after severe anoxia were hemiplegia, parkinsonism, dysphasia, and visual agnosia. Multiple defects in intellectual function were also found in all cases, and constructional apraxia was especially common. This might persist after full consciousness had been regained, and interfere with performance if the patient was allowed to return too soon to work.

Dr. P. D. BEDFORD (Oxford) drew attention to further clinical states. Transient effects of cerebral anoxia included sleep disturbances, nightmares, and somnambulism, and these also occurred in heart-failure, toxæmia, and pyrexia; some other transient disorders were nocturnal confusion, periodic breathing, organic cerebral reactions, and organic neurasthenia. He thought that many of these disturbances were produced in old people by histotoxic drugs which also depressed the respiratory centre, and he recommended cautious dosage and preferably replacement by paraldehyde. Permanent clinical effects included organic neurasthenia, with symptoms such as lack of concentration, and dementia as seen after asphyxial episodes, operations under general anæsthesia, or in shock from massive hæmorrhage or coronary occlusion. Localised cerebral damage due to focal cerebral infarcts occurred in cor pulmonale. Dr. Bedford wondered whether personal susceptibility or idiosyncrasy explained why many patients were unaffected by a period of anoxia.

Prof. A. MEYER reported on brains he and his collaborators had examined in 6 cases of cerebral anoxia due to ether and nitrous oxide. Cardiac or respiratory arrest had occurred in all cases, varying from 1 to 25 minutes. The commonest lesions were necrosis of the third layer of the cerebral cortex, Purkinje cells, striate body, and globus pallidus. The reticular zone of the substantia nigra, the corpus subthalamicum, and the dentate nucleus were less commonly affected. Surprisingly severe necrosis of the thalamus was observed in 3 cases, and it had also been encountered in cases of carbon-monoxide poisoning, hypoglycæmia, and death from hanging.

Professor Meyer thought that it should be often possible to differentiate between senile and anoxic changes. Selective vulnerability was a complex problem and depended on several factors which might vary between different types of anoxia as well as between individual cases.

Dr. A. L. WOOLF was interested to hear Professor Meyer cite epilepsy as a cause of cerebral anoxia. He referred to a child with severe epilepsy twenty-four hours after head injury in whom the convulsions were followed by deepening unconsciousness and death in four days. The changes in the brain were similar to those described by Professor Meyer in his other cases of anoxia.

Dr. CECIL GRAY (Liverpool) expressed disapproval at ether and nitrous oxide being nominated as the cause of death in many of the cases mentioned by the speakers;

such deaths should be ascribed to gross mismanagement of anæsthesia. He was disappointed that no mention had been made of any therapeutic measure. He wondered whether after an anoxic incident ensuing cerebral œdema prolonged and increased the damage; and might hypothermia be indicated to mitigate the damage in this immediate postanoxic period?

Dr. B. G. B. LUCAS thought that more stress should be laid on the difference between cerebral anoxia and cerebral ischæmia. In the latter not only was the oxygen cut off but in addition there was deprivation of substrate; in these cases the damage was more severe and recovery less likely. He had found it difficult to obtain experimental evidence of cerebral damage due to anoxia alone, but ischæmic changes induced by centrifugation were easily demonstrable.

Dr. F. FONSECA (Portugal) asked whether glutamic acid had been tried in cases of cerebral anoxia; and Dr. LUCAS replied that he had had no success with it but thought that succinic acid had helped in 2 out of 3 cases of carbon-monoxide poisoning in which he had tried it.

Dr. D. H. P. COPE drew attention to hyperpyrexia as an important clinical sign. He said that he and Dr. D. E. Argent had been treating cerebral anoxia by a dehydration regimen in accordance with the hypothesis put forward by Seldon that some of the cells were reversibly damaged by the anoxia, and that their survival was threatened by ensuing cerebral œdema caused by simultaneous anoxic damage to the cerebral capillaries. He had seen beneficial results in cases of cerebral anoxia treated by intravenous 50% sucrose followed by a 10% dextran drip. A lot of the terrible post-anoxic sequelæ might be avoided if this therapy were used more often.

Dr. WOOLF replied that in his view cerebral œdema had only a very small effect on the vitality of nerve-cells, but was, nevertheless, important as a cause of cerebral damage owing to its effect on nerve-fibres and especially myelin sheaths.

Professor MEYER, replying to the discussion, said that from the pathogenic point of view anoxia was a combination of direct action of oxygen want on the nerve-cells, capillary stasis resulting in ischæmia, and increased permeability resulting in œdema. All these factors must be considered in explaining the localisation of the lesions. He cited a report by Lindenberg that cerebral œdema might exercise particular pressure on certain arteries at the base of the brain or in the depth of sulci.

Dr. BEDFORD did not subscribe to the use of hypothermia in these cases; he found it difficult to envisage cerebral ischæmia occurring clinically without cerebral anoxia.

Dr. ALLISON said that the term "organic neurasthenia" was undesirable as it conveyed the impression of a functional origin. He had been impressed by the clinical similarity between post-anoxic and some post-traumatic conditions and wondered whether œdema was perhaps a common factor.

New Inventions

AN IMPROVED METABOLIC BED

FOR quantitative analysis in the diagnosis and management of disease, accurate collection of urine and fæces over timed periods is commonly necessary. Some form of metabolic bed must be used for infants or incontinent patients, and prevention of pressure-sores may be difficult if collections are prolonged. By means of a specially designed foam mattress on a wooden frame, collections have been made without difficulty from children for several consecutive days for detailed metabolic studies, particularly in phenylketonuria.

The mattress (fig. 1), made of foam-rubber, has a single central hole 6–8 in. in diameter (the size depending upon the size of the patient); and a smaller hole 2 in. in front of the main one carries the glass or plastic urinal required for collection in boys. The mattress is encased in an impermeable rubber sheath to which the foam-rubber is firmly attached throughout. This permits sterilisation and also prevents wrinkling of the mattress, which is one of the principal factors in the development of sores. Washable rubber flanges protect the inner surfaces of the two holes, and through the larger hole fæcal collections are made without soiling the mattress. The entire mattress can be scrubbed and can be sterilised by autoclaving, either with formalin or by steam sterilisation.

The mattress is placed on a wooden frame (fig. 2) which has a firm plywood base complete except for two holes corresponding to those in the mattress itself. The under-part of the frame is hollow and a flap permits siting of receptacles beneath the holes in the mattress for collection of urine and fæces separately. The frame and mattress are made to fit inside a standard child's cot. The head of the frame can be raised; this eases nursing and prevents the child slipping off the mattress holes. The child rests directly on the rubber skin of the mattress with draw-sheets above and below the holes and with the buttocks resting over the larger hole. A cruciform binder, with armholes and with buttons down the back, secures the child in the required position and allows considerable freedom of movement of the arms and legs, only the pelvis being held above the mattress hole. A second, similar, restrainer applied correctly—i.e., with the buttons at the front—prevents the child from falling forward, but still allows freedom of

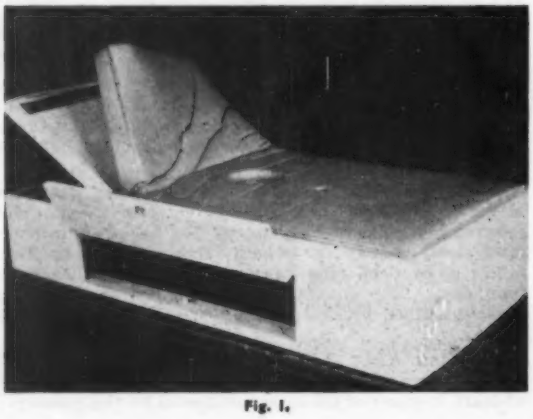


Fig. 1.

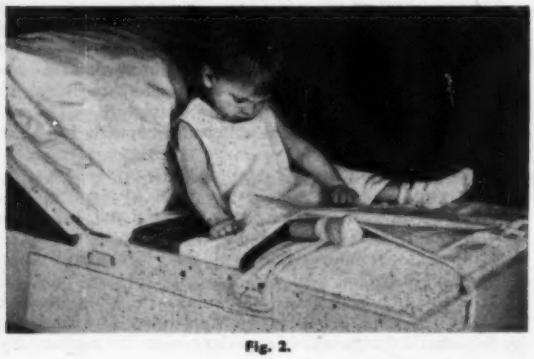


Fig. 2.

movement in the sitting position. The natural springiness of the sponge-rubber permits considerable movement and prevents local pressure effects; in fact the "bouncing" effect of the sponge-rubber has given considerable enjoyment to the younger patients and encouraged movements. It has not therefore been found necessary to fix the arms; but with more active children the legs have to be lightly secured to the sides of the frame in the manner shown, in order to prevent them from turning over completely on the mattress.

Collections have been made for up to three consecutive days; longer periods are not advised because of the risk of pressure-sores around the buttocks due to the lip of the larger hole. Usually intermittent twenty-four-hour collections are made (e.g., in the study of phenylketonuria) once or twice weekly for balance studies, and shorter timed collections can be made for other diagnostic purposes.

It is a pleasure to acknowledge the help and advice of Mr. R. L. Dunn, research and development department, Dunlop Rubber Company, Ltd., Liverpool, by whose 'Dunlopillo' division the mattresses were made. I am also grateful to Dr. F. L. Ker, medical superintendent, Little Bromwich Hospital, for permission to describe the binder; to Sister C. W. Harris for nursing the patients; and to Dr. R. F. Fletcher for the photographs. The plastic urinal is manufactured by the Laboratory Glass Blower Company, Valley Works, Lane End Road, Sands, High Wycombe, Bucks.

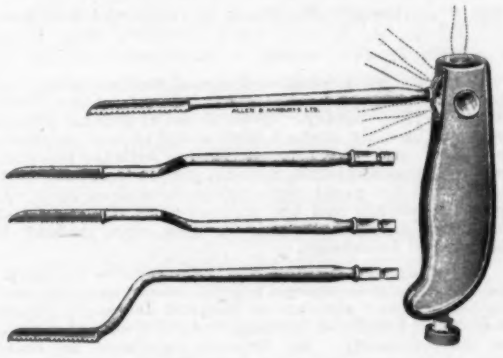
Metabolic Research Unit,
Little Bromwich Hospital,
Birmingham

J. D. BLAINEY
M.D. Lond., M.R.C.P.

COMBINED NASAL SAW

ONE of the difficulties encountered in the use of the conventional type of nasal saw is that the angle of the blade in relation to the handle does not always offer the correct working position. Another difficulty has been that the size and shape of the handle in most of the existing patterns do not always fit with ease to the hand.

Messrs. Allen & Hanburys Ltd have made, at my suggestion, a combined saw consisting of a special handle



and four rapidly interchangeable blades. The handle is designed to fit comfortably to the hand and contains a blade socket on a rotating mount which can be locked at any desired lateral angle over a wide range. In addition the socket is so arranged that the blade can be used in an "in line" position with the handle.

The set of blades comprises two fine nasal saws cranked right and left, a broad saw with a double row of teeth on a straight shaft, and a Ragnell-type jaw saw.

The virtue of this combined saw lies in the handle, which is not only comfortable to hold but also allows the angle of the blade to be easily adjusted to ensure the best working position for the surgeon, with corresponding freedom from fatigue.

Stoke Mandeville Hospital,
Aylesbury, Bucks

J. P. REIDY
F.R.C.S.

Reviews of Books

Professional Negligence

J. P. EDDY, Q.C. London: Stevens. 1955. Pp. 146. 13*s*. 6*d*.

IN the lectures on which this book is based, Mr. Eddy first discusses the general principles of the law of negligence and then deals separately with the different professions. The subject is not an easy one, but Mr. Eddy has a very readable style and, with few exceptions, he has avoided difficult legal language.

In the chapter on doctors, Mr. Eddy discusses the standard of care required of medical men; the duty of the doctor to warn the patient of danger which may arise from a particular course of treatment; the legal implications of the confidential relationship between doctor and patient; and the liability of hospitals. He ascribes the growth in the number of actions against hospital authorities to four causes—the changed status of the hospitals, the payment of hospital staffs, the legal-aid system, and the decision of the Court of Appeal in *Cassidy* v. *Ministry of Health* (1951).

Many pages are devoted to a résumé of the more important decisions on the liability of hospitals, including some even more recent than that in the Cassidy case. In earlier cases the courts began with the doctor or nurse; if it were shown that he or she had been negligent, then the court would consider whether that person could be regarded as a servant for whose negligence the hospital was liable. In Cassidy's case, the Court of Appeal approached the matter rather differently. The decision supports the proposition that the hospital itself is under a duty of care to those in its charge; of course, the hospital must act through doctors and nurses, but the hospital cannot escape liability on that ground. This approach had indeed been adumbrated by the Court of Appeal in the earlier case of *Gold* v. *Essex County Council*—which is also discussed by Mr. Eddy—but it was not the basis of the decision in that case.

Logically pursued, this new approach might make it irrelevant to consider the status of the doctor involved in the case, so that the hospital would be liable equally for the negligence of consultants and men under contracts of service. The three members of the Court of Appeal were not required to decide that point in the Cassidy case because all the doctors involved were under contracts of service. Lord Justice Denning made it plain, however, that he at least was willing so to decide. In any event, his judgment makes it clear that the reason why employers were liable for the negligence of servants is "not because they could control the way in which the work was done—they often had not sufficient knowledge to do so—but because they had employed the staff and had chosen them for the task and had in their hands the ultimate sanction for good conduct, the power of dismissal."

All this is implicit in the copious extracts quoted by Mr. Eddy, but his own summing up of the Cassidy decision is somewhat guarded and he does not speculate on the possible implications of the decision for the profession. Caution on this difficult subject is perhaps the prudent course, however, and many readers will certainly be indebted to Mr. Eddy for his clear summary of the cases.

A Text Book of Medicine

9th ed. Editors: RUSSELL L. CECIL, M.D., SC.D., professor of clinical medicine emeritus, Cornell University, New York; ROBERT F. LOEB, M.D., LL.D., Bard professor of medicine, Columbia University, New York. Philadelphia and London: W. B. Saunders. 1955. Pp. 1786. £5 5*s*.

FOR twenty-five years this celebrated textbook has enjoyed an enviable reputation on both sides of the Atlantic. Despite the great number of authors (there are over 170 contributors) the standard is almost uniformly high and the information up to date. If the reader wants to look up the use of 'Versenate' in lead-poisoning, or the therapeutic uses of cobalt, or the indications for surgery in heart-disease, or the present position of pulmonary function tests, the information is there, supported by useful references.

Only the neurological section seems uneven: there is, for example, no discussion of the common problem of cervical spondylosis and its effects upon the cord; and the article on acroparæsthesia does not mention the good results achieved by decompression of the median nerve.

A most valuable feature is the emphasis on the biochemical and physiological aspects of disease, and the account by Professor Loeb of the metabolic processes in diabetes is outstanding.

Studies on the Cerebral Cortex

SANTIAGO RAMON Y CAJAL. Translated by LISBETH M. KRAFT. London: Lloyd Luke. 1955. Pp. 179. 27*s.* 6*d.*

DURING 1901 and 1902 Cajal published a series of papers in the *Trabajos del Laboratorio de Investigaciones Biologicas de la Universidad de Madrid*, on the "limbic lobe," which Broca had described in 1878. Cajal's studies were undertaken to discover the relationship of this part of the brain to olfactory function. They formed part of a more extensive paper on the origins and terminations of the olfactory, optic, and acoustic nerves in vertebrates which had already been presented to the Royal Academy of Medicine of Madrid. Many will be grateful to Dr. Kraft for her admirable and careful translation, and to Dr. Paul D. Maclean who encouraged her to undertake the work and so make another of Cajal's classical studies available to the English-speaking world for the first time in its original form. The publication is timely in view of the present great interest in the control of psychomotor epilepsy. The drawings are well reproduced.

Selection of Anesthesia

JOHN ADRIANI, M.D., director, department of anesthesiology, Charity Hospital; professor of surgery, school of medicine, Tulane University, Louisiana. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1955. Pp. 327. 47*s.* 6*d.*

THIS book is best considered in relation to the circumstances of anæsthesia in the United States, where most anæsthetics are still administered by nurse-technicians. Supervision may be by an anæsthetist, but is often by the surgeon, so that the selection of drugs and technique may have to be made by someone who has no special knowledge or training in the specialty. For him and for physicians who are asked to advise on the fitness of patients for anæsthesia, Dr. Adriani has collected a considerable amount of factual knowledge. The pharmacological effects of drugs used in anæsthesia, and their relation to non-surgical conditions and to the operation, are set out so that the method best suited to the individual case can be chosen.

Some may doubt whether this is the best way of selecting an anæsthetic, since practical experience is often a better guide to safety than a theoretical knowledge of drug action, though a combination of both is obviously ideal. Nevertheless, as the doctor must in this case advise the technician, it is as well that he should have some understanding of the problems from the anæsthetic rather than the purely pharmacological or physiological point of view. This he can obtain simply and accurately from Dr. Adriani's book, but he must make some allowance for the differences in clinical practice on the two sides of the Atlantic.

Textbook of Occupational Therapy

With chief reference to Psychological Medicine. E. N. M. O'SULLIVAN, M.B., D.P.M., superindentent, Killarney Mental Hospital. London: H. K. Lewis. 1955. Pp. 319. 21*s.*

THIS comprehensive book deals with every aspect of occupational therapy, with special reference to psychiatry. It covers the history, objects, organisation, and craft analysis; and there is a description of the mental diseases likely to be met with by the therapists.

Dr. O'Sullivan recognises that occupational therapy covers much more than merely crafts, and he sees the importance of recreation pure and simple, as well as work in the utility sections. He stresses the importance of constant contact with the doctor, who should always prescribe and supervise.

The establishment of 3 trained occupational therapists in a hospital of 1000 beds seems very modest; but when this establishment is increased, as Dr. O'Sullivan suggests, by attaching nurses and special technicians skilled in certain handicrafts, patients will have the best of different disciplines. His re-educational scheme is well planned: too well planned perhaps, since the complete regimentation that he describes on pp. 115–118 might fail to be therapeutic.

In contrast to most mental hospitals in this country, the segregation of the sexes in Dr. O'Sullivan's hospital appears to be rigid, and apart from entertainments a special occupational therapist is allocated to each sex.

This book is a valuable addition to the medical and nursing libraries of the mental hospital.

Atlas de chirurgie thyroidienne

JACQUES FRANCILLON, chirurgieu des Hôpitaux de Lyon; CLAUDE GABRIELLE, Interne des Hôpitaux de Lyon. Paris: Expansion Scientifique Française. 1955. Pp. 180. Fr. 3000.

BY means of copious and clear illustrations with an explanatory text opposite each, the authors deal fully with the surgery of the thyroid. They describe in detail several operation techniques, emphasising the many difficulties and suggesting methods of surmounting them. Unfortunately the choice of techniques is left to the reader, who is given no lead as to which the authors think best.

Different methods of incision are described, but the writers apparently prefer the old-fashioned "U" incision, since this is used in all the illustrations of technique.

A chapter is devoted to dislocation of the thyroid, and includes a minute description of its blood-supply and all possible methods of hæmostatic control. The normal and abnormal anatomy of the recurrent laryngeal nerves and of the parathyroids are fully described.

Another chapter reviews the many techniques employed for the resection of the thyroid lobes, with and without exteriorisation. And the final chapter describes in minute detail different techniques in suturing and drainage.

A wide survey has been made into the literature and techniques of thyroid surgery which should prove extremely interesting to surgeons experienced in this specialty.

The Practitioner's Handbook to the Social Services

ALFRED H. HAYNES, F.W.I. Bristol: John Wright. 1955. Pp. 124. 9*s.* 6*d.*

WRITTEN by a practising social welfare officer, this book gives a good account of the details of the Welfare State in this country. Even those in general practice, who are in daily contact with social as well as medical problems, and who are most familiar with the machinery of the National Health Service, will be surprised at the extent of the social organisation here described. The practitioner will find the answers to problems of social administration into which he had some insight but lacked full knowledge.

In its fourteen chapters the book includes the work of executive councils, regional hospital boards, and local health authorities, and accounts of National Insurance, National Assistance, Education, Housing, Legal Aid, and other services to the community. Mr. Haynes's experience has enabled him to interpret the many Acts of Parliament and other official documents in a readable way.

The book will be useful to the visitors to this country who require a short but comprehensive account of our social services, and to the new entrant to general practice.

Whitaker's Almanack 1956 (London: Whitaker. Pp. 1190. 17*s.* 6*d.*).—This year's issue includes as features additional to its well-known repertory: (1) the Ministry of Labour's Index of Retail Prices, showing the level for each month from June, 1947, to August, 1955, and detailed figures for the latter month; (2) two tables showing the distribution of gross and net incomes; (3) a table showing personal expenditure; and (4) a comparison of the expenditure of Local Authorities and that of the Central Government. The principal ships of the Royal Navy at last stage a comeback, and the national and the local Nature reserves are described.

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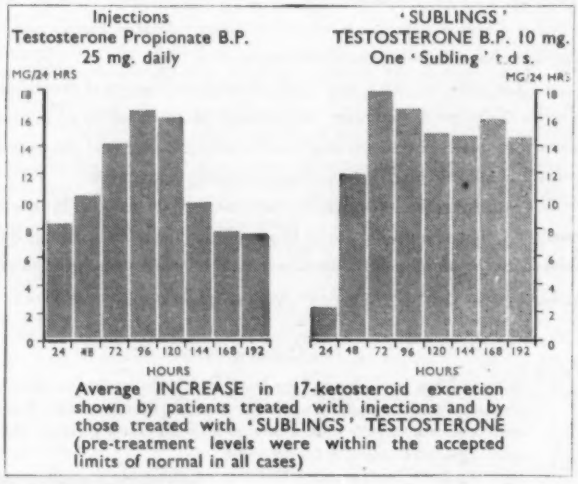

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THE LANCET

LONDON: SATURDAY, JAN. 21, 1956

Aldosterone

IT has been known for many years that the adrenal glands exercise an important control over electrolyte metabolism by secreting a hormone with actions similar to those of the synthetic substance, deoxycortone. First isolated in 1952, the natural hormone was named electrocortin,[1] but this was changed to aldosterone two years later when the chemical structure was determined and it was found that the molecule contained an aldehyde group at the C 18 position.[2] The hormone has recently been synthesised: and in a commendably short time much has been learnt about its rôle in health and disease, although advances are still hampered by a lack of reliable simple methods—chemical or biological—for estimating aldosterone in blood or urine.

Aldosterone is formed in the glomerulosa cells of the adrenal cortex, and it has a profound effect on the excretion of electrolytes, being many times more active than deoxycortone.[3] It causes retention of sodium and increased elimination of potassium. The rate of secretion does not seem to be influenced directly by pituitary trophic hormones, since, although the urinary excretion of aldosterone falls to nothing in addisonian and adrenalectomised patients, normal values are reported after hypophysectomy and in patients with panhypopituitarism.[4 5] Corticotrophin (A.C.T.H.) does not increase the secretion of aldosterone [4 6 7]; nor does aldosterone, in contrast to cortisone, suppress the pituitary secretion of corticotrophin in pseudohermaphroditism.[8] Thus it has been supposed that the secretion of aldosterone is in some way regulated by the electrolyte or water content of the body. Changes in sodium, potassium, and water are so closely related that it is difficult to know which is the primary controller of aldosterone secretion. In man a reduction in dietary sodium [9 10] or loss of sodium (in salt-losing nephritis,[11] excessive sweating,[12] or following a sodium diuresis [13]) is associated with increased aldosterone secretion. In dogs, however, sodium depletion causes increased aldosterone production only when associated with an increased intake of potassium [14]; and in rats the weight of the glomerulosa layer of the adrenal cortex correlates better with changes in the serum-potassium level than in the sodium level.[15] Recently in man, LARAGH and his associates [16] have found that restriction of sodium, even when accompanied by a fall in serum-sodium concentration, is followed by little change in aldosterone production unless potassium is provided in the diet. Thus, although sodium restriction may exert its effect by modifying sodium-potassium relationships in the body, it seems that potassium may be the primary regulator. Changes in the effective plasma-volume may also exert some control through hypothetical volume receptors.

Aldosterone secretion is diminished or completely suppressed in Addison's disease and after adrenalectomy, and this is largely responsible for the sodium depletion, potassium retention, and dehydration. Aldosterone parenterally or by mouth [8 17 18] is effective replacement therapy, although in practice fluorohydrocortisone [19] gives satisfactory control. Increased aldosterone secretion has been recorded after surgical operations,[20] and in patients with œdema due to cardiac, renal, or liver disease.[5 9 21] In œdematous states the stimulus to increased aldosterone secretion may be a reduction in effective plasma-volume or a potential change in the sodium or potassium concentration in the plasma. Hence, in these circumstances MACH et al. have suggested the term secondary hyperaldosteronism.[22]

Primary hyperaldosteronism was first described by CONN [23] in 1954, and during the past eighteen months about a dozen similar cases have been recognised, although not all have yet been reported in the medical press. The cause of the condition is an adrenocortical tumour—usually an adenoma but occasionally a carcinoma—which secretes excessive amounts of aldosterone. The clinical picture is characterised by intermittent muscular pains, cramps, weakness, and paralysis; hypertension; renal dysfunction shown by polyuria, nocturia, and albuminuria; and in some cases by pins-and-needles and tetany. The laboratory findings are hypokalæmia, mild hypernatræmia, alkalosis, and inability of the kidney to secrete an acid urine after a loading dose of ammonium chloride. In the past, attention was focused on the renal disturbance, and at least 2 cases have understandably been diagnosed as potassium-losing nephritis, but in both the adrenal tumour has subsequently been located and removed. On an earlier page of this issue, Dr. CHALMERS and his colleagues describe one of these cases; and the other was recorded by EVANS and MILNE.[24 25] Metabolic studies have shown excessive excretion of potassium in urine and fæces, and concomitant retention of sodium.[24 26] A high potassium intake led to loss of sodium, but these changes took

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2. Simpson, S. A., Tait, J. F., Wettstein, A., Neher, R., von Euw, J., Schindler, O., Reichstein, T. *Experientia*, 1954, **10**, 132.
3. Muller, A. F., Mach, E., Naegeli, H. *Acta endocr., Copenhagen*, 1955, **20**, 113.
4. Gordon, E. S., Chart, J. J., Hagedorn, D., Shipley, E. G. *Obstet. Gynec.* 1954, **4**, 39.
5. Luetscher, J. A., Axelrad, B. J. *J. clin. Endocrin.* 1954, **14**, 1086.
6. Cope, C. L., Llaurado, J. G. *Brit. med. J.* 1954, i, 1290.
7. Venning, E. G., Carballeira, A., Dyrenfurth, I. *J. clin. Endocrin.* 1954, **14**, 784.
8. Prunty, F. T. G., McSwiney, R. R., Mills, I. H., Smith, M. A. *Lancet*, 1954, ii, 620.
9. Luetscher, J. A., Johnson, B. B. *J. clin. Invest.* 1954, **33**, 1441.
10. Falbriard, A., Muller, A. F., Neher, R., Mach, R. S. *Schweiz. med. Wschr.* 1955, **85**, 1218.
11. Luetscher, J. A., Curtis, R. H. *J. clin. Invest.* 1955, **34**, 951.
12. Conn, J. W., Louis, L. H. *J. clin. Endocrin.* 1950, **10**, 12.
13. Falbriard, A., Muller, A. F., Crabbe, J., Duckert, A. *Helv. med. acta.* 1955, **22**, 495.
14. Laragh, J. H., Stoerk, H. C. *J. clin. Invest.* 1955, **34**, 913.
15. Stoerk, H. C., Knowlton, A. I., Loeb, E. N. *Ibid*, p. 965.
16. *Lancet*, 1955, i, 1167.
17. Mach, R. S., Fabre, J., Duckert, A., Borth, R., Ducommun, P. *Schweiz. med. Wschr.* 1954, **84**, 407.
18. Kekwick, A., Pawan, G. L. S. *Lancet*, 1954, ii, 162.
19. See *Ibid*, 1955, i, 853.
20. Llaurado, J. G. *Ibid*, p. 1295.
21. Luetscher, J. A., Neher, R., Wettstein, A. *Experientia*, 1954, **10**, 456.
22. Mach, R. S., Fabre, J., Muller, A. F., Neher, R. *Schweiz. med. Wschr.* 1955, **85**, 1229.
23. Conn, J. W. *J. Lab. clin. Med.* 1955, **45**, 3.
24. Evans, B. M., Milne, M. D. *Brit. med. J.* 1954, ii, 1067.
25. Milne, M. D. Personal communication.
26. Mader, I. J., Iseri, L. T. *Amer. J. Med.* 1955, **19**, 976.

place primarily within the cells, which may help to explain the absence of œdema despite considerable sodium retention. A striking feature in the patient described by Dr. CHALMERS and his colleagues was the degree of hypertension, which fell from 220/140 mm. Hg to 160/90 after removal of the tumour. It remains to be seen how far the renal disturbances are permanent: some are directly attributable to potassium depletion and hence are potentially reversible; others may be related to nephrosclerosis.

In the early stages of aldosteronism the correct diagnosis may be suggested by a combination of hypertension and hypokalæmia, which may be suspected from the electrocardiogram. It is important to determine what rôle, if any, aldosterone has in the genesis of essential hypertension: already it has been claimed that the excretion of the hormone is increased in this disease.[27] A puzzling feature of Conn's syndrome is the absence of œdema. Professor MACH and his associates have described a woman with recurring attacks of œdema and sodium retention who excreted increased amounts of aldosterone but did not have hypokalæmia or polyuria.[22] They suggest that the clinical picture may be determined by the amount of aldosterone secreted, since small doses of deoxycortone cause salt and water retention whereas, in dogs, large doses induce a polyuria and hypokalæmia.

Contraception

> "Control by men and women over the numbers of their children is one of the first conditions of their own and the community's welfare, and in our view mechanical and chemical means of contraception have to be accepted as part of the modern means, however imperfect, by which it can be exercised."—ROYAL COMMISSION ON POPULATION.[28]

CONTRACEPTION now plays an important, and many would say a beneficial, part in our daily lives. Apart from those who object on religious grounds, there are probably few married couples who do not at some time employ it. But it is not true, as many unmarried people assume, that there exists "contraceptive information" which makes it possible to avoid or space pregnancies without difficulty, and without prejudice to coital enjoyment. Contraception by the best available methods, occlusive or spermicidal, is a nuisance and often an anxiety. It can be practised with fair success, so far as avoidance of pregnancy is concerned, by educated people with good sanitary facilities, using it upon premeditated occasions, but for the ill-equipped or unintelligent it is quite inadequate. This view is well restated by Dr. G. I. M. SWYER[29] in the January issue of *Family Planning*, which celebrates the twenty-fifth anniversary of the Family Planning Association. Reviewing the work on contraceptives now in progress, SWYER says that research on less clumsy and more reliable techniques for controlling fertility has had a recent impetus from fears about the world's food-supply; and it is reasonable and right to expect contraception to contribute to the solution of this problem. But the tone of some "neo-Malthusian" comment merits the rebuke directed by JAMES PARKINSON to MALTHUS, that "if the population exceeded the means of support, the fault lay not in Nature, but in the ability of politicians to discover some latent defect in the laws respecting the division and appropriation of property." A more liberal justification for contraceptive research lies in the part which a simple and reliable method could play in extending human freedom of choice and deepening human relationships. The biologist who gives time to this problem need have no doubt that he is meeting a universal human need and wish.

An ideal contraceptive should, in the words of PARKES,[30] "be effective over a known period of time, simple enough to be generally available and easily usable by any people intelligent enough to know the possible consequences of coitus, and whether they do or do not wish to conceive. Ideally, it should involve only occasional dosage by mouth. It should certainly not depend on local action contemporaneous with coitus. It should have no other effects than the prevention of conception"—or, of course, prejudice subsequent fertility when discontinued. In seeking biological means of achieving this, attention has been devoted to two groups of substances: (1) antihyaluronidases, which interfere with the penetration of the ovum by sperms, and (2) two materials which have been regarded as hormone antagonists—namely, extract of gromwell (lithospermum), which appears to antagonise the pituitary gonadotrophins, and *m*-xylohydroquinone. This second substance was identified by SANYAL[31] as the ingredient of oil of peas which reduced the fecundity of rats on a pea-meal diet, and it seems to antagonise vitamin E and to inhibit the actions of œstrogen and progesterone on the endometrium. Synthetic *m*-xylohydroquinone has had fairly extensive field trials in India,[32 33] capsules being administered to women monthly at about the time of ovulation; and it certainly appears to reduce fertility. But recent papers by SANYAL and his co-workers provide a striking example of the problems which arise in such work. With contraceptives, though toxicity tests in animals can and must be undertaken, clinical trial on human patients, on a large scale, is the only final means of estimating efficacy and judging untoward effects on health, subsequent fertility, and any pregnancies which may occur in spite of the drug. In these respects *m*-xylohydroquinone satisfied its investigators—on the basis of some blood, urine, and pulse-rate investigations during the experiment, undertaken, it seems, to meet criticism from America that toxicity had not been fully excluded; and in view of the fact that it had been previously given to over 800 private patients without complaint, SANYAL, BANERJEE, and SEN[33] conclude that "all these definitely prove that *m*-xylohydroquinone is not at all toxic to the human system." They now propose to investigate its exact mode of action. As the substance concerned is said to be a hormone antagonist affecting both œstrogen and progesterone, one must hope that their confidence is justified, for the tests so far reported would prove the harmlessness of, say, benzpyrene. In present circumstances women in Asia might well be prepared to accept some degree

27. Genest, J. *Canad. med. Ass. J.* 1955, **73**, 876.
28. Report of the Royal Commission on Population. H.M. Stationery Office, 1949.
29. Swyer, G. I. M. *Family Planning*, 1955, **4**, 11.
30. Parkes, A. S. *Proc. Soc. Stud. Fertil.* 1953, **5**, 20.
31. Sanyal, S. N. *Sci. & Cult.* 1949, **15**, 159; *Int. med. Abstr.* 1955, **16**, 91.
32. Sanyal, S. N., Ghosh, S. *Int. med. Abstr.* 1955, **18**, 101.
33. Sanyal, S. N., Banerjee, S. C., Sen, J. *Ibid*, p. 31.

of risk if it freed them from the burden of child-bearing—often itself fatal. But most medical workers would hold that where calculated risks are taken they should in fact be calculated, and the calculation should include that of the patients.

Conducted with better facilities, the studies of lithospermum extract are rather less alarming, and with this preparation the risks of clinical trial would not exceed those of any other new and active biological agent. Should it prove to be an anti-gonadotrophin inhibiting ovulation, its use (as SWYER points out) might have to be periodically discontinued to prevent derangement of ovarian function; but it is apparently not fully effective in this respect. Phosphorylated hesperidin (rehibin), which inhibits the seminal hyaluronidase, offers what seems a less hazardous approach, though its efficacy by mouth has not been proven. Local action on the sperms, either before or after they leave the male, seems greatly preferable to alteration of the female endocrine balance. (Some of the methods that have been proposed, such as the use of œstrogens to induce tubal spasm which will imprison the ovum, seem to offer almost unlimited possibilities of mischief; and ZUCKERMAN'S [34] account of the recent Tokyo conference mentions a chemical which has already produced abnormal fœtuses in a clinical trial.) Among the more familar expedients to which SWYER refers, improved occlusive tampons suitable for use under tropical conditions offer at least a partial protection, and work on these is going on. Immunological methods of inducing "hostility" to sperms of a given father have so far progressed little, and would probably fall in the category of "luxury" contraceptives. It is the poor man (or woman) under bad conditions who most needs and desires an advance in biological methods of controlling fertility. We should work more systematically to provide it for him. Both in quantity and quality, existing research leaves a lot to be desired,[35] and the "disreputability" of contraception still anachronistically limits the number of first-rate workers.

Attention should be drawn, however, to an aspect of this research—or rather of public reaction to it—which is seldom mentioned. The people of some Asian and African countries, though they want contraceptive facilities as a right, have reservations which in their position we might share. Any suggestion that "the West" was trying to produce a substance with which foodstuffs could be doctored and the fertility of Eastern peoples reduced might release a reaction far more powerful than the Indian Mutiny precipitated by the use of pig grease on cartridges. Such suspicions have been voiced; they have all the psychological attributes of an ideal rumour; and unguarded remarks about the beneficial effects of radiation in lowering the population of the world (in countries other than that of the speaker) may lend colour to them. For such reasons the spirit in which biologists and doctors approach this problem, and their motives in working on it, may be as important to their ultimate success as is their technical proficiency. If, as many believe, we are developing in contraception a human right and a human freedom, it will do no harm to say so fairly often.

34. Zuckerman, S. *Nature, Lond.* Jan. 14, 1956, p. 58.
35. Pirie, N. W. *Lancet*, 1952, i, 54.

Annotations

TREATMENT OF LUNG ABSCESS

THERE are few diseases in which more spectacular therapeutic progress has been made in recent years than in simple lung abscess. As recently as 1936, Allen and Blackman [1] reported a mortality of 34%. Treatment at that time consisted essentially in external drainage of the abscess, and complications such as empyema and brain abscess were frequent. The advent of sulphonamides had no great influence on prognosis, but the technique of surgical drainage improved so much that by 1941 Neuhof and his colleagues [2] were able to record a mortality of only 4% for acute cases, though the mortality for subacute and chronic localised abscesses remained as high as 23%. Penicillin produced an even greater change by reducing the number of cases in which surgery was required, and Shoemaker et al.[3] now affirm that simple lung abscess should be regarded as a "medical" disease. As for ætiology, they hold the generally accepted view that although some simple lung abscesses are caused by trauma or blood-borne infection, or develop from a specific bacterial pneumonia, the great majority result from aspiration of infected material from the mouth or upper respiratory passages into the lungs. The natural defences of the lower respiratory tract against intrusion from above are relaxed during sleep and other states of unconsciousness, and it is significant that in a considerable proportion of cases of lung abscess there is a previous history of gross dental sepsis, oropharyngeal operation, epilepsy, general anæsthesia, or a bout of drunkenness.[3–6] Moreover, Brock et al.[7] demonstrated that material introduced into the trachea gravitated into the dependent upper lobe when the subject was lying on his side, and into the dependent apex of the lower lobe when he was lying on his back; and as these are the commonest sites of abscess formation the inference is obvious.

Shoemaker et al.[3] analysed the results in 67 simple lung abscesses treated between 1950 and 1954. Surgical resection was used in 24—in some of the earlier cases because it was thought to be the best treatment and in others because carcinoma was suspected. Confidence in the efficacy of chemotherapy grew with experience, however, and it was eventually concluded that this was the treatment of choice, regardless of the duration of the abscess, so that in 1954 resection was performed in only 2 cases, in both because of possible malignancy. Only 1 patient in the series failed to respond to adequate chemotherapy, and here the presence of a broncholith provided an explanation. Penicillin was considered the best antibiotic, and it was used in all cases with sulphonamide added, unless for some reason the latter was contra-indicated. Cavities closed in four to eight weeks, and residual radiographic opacities decreased in size over a period sometimes as long as six months.

Gittens and Mihaly [4 8] evaluated the efficacy of various antibiotics in lung abscess, but they were unable to decide that one was more successful than another. Nevertheless, they too concluded that penicillin is the drug of choice because, apart from its small cost, prolonged administration does not entail certain dangers, such as fungal overgrowth in the lungs and disturbance of the intestinal bacterial flora, which are associated with the newer

1. Allen, C. I., Blackman, J. F. *J. thorac. Surg.* 1936, **6**, 156.
2. Neuhof, H., Touroff, A. S. W., Aufses, A. H. *Ann. Surg.* 1941, **113**, 209.
3. Shoemaker, E. H., Yow, E. M., Byrd, W. C. *Arch. intern. Med.* 1955, **96**, 683.
4. Gittens, S. A., Mihaly, J. P. *Amer. J. Surg.* 1955, **89**, 986.
5. Waterman, D. H., Domm, S. E., Rogers, W. K. *Ibid*, p. 995.
6. Strang, C., Simpson, J. A. *Thorax*, 1953, **8**, 11.
7. Brock, R. C., Hodgkiss, F., Jones, H. O. *Guy's Hosp. Rep.* 1942, **91**, 131.
8. Gittens, S. A., Mihaly, J. P. *Amer. Rev. Tubere.* 1954, **69**, 5.

broad-spectrum antibiotics in general, or the risk of blood dyscrasia, which is associated with chloramphenicol in particular. Postural drainage, bronchoscopic aspiration of pus, aerosol administration of drugs, and instillation of the appropriate antibiotic directly into the affected segment of lung are adjuvants to chemotherapy which have been advocated,[4 5 9–13] but Shoemaker et al. consider them unnecessary. Surgery, they believe, should be confined to resection in cases in which there is recurrence after adequate medical treatment, in which bronchial drainage is impeded by organic obstruction, or in which carcinoma is suspected. These views are now probably widely accepted, although Waterman et al.[5] have lately contended that the pendulum has swung too far away from surgery. They think that there is a restricted field in which external drainage is preferable to resection—in old, feeble patients, for example. They believe also that many physicians have an exaggerated idea of the decline in incidence of simple lung abscess; but whatever the exact fall, there seems little doubt that the condition is nowadays much less common in hospital practice than it was, probably because of the alacrity with which chemotherapy is given when there is evidence of respiratory infection. When a lung abscess is encountered it is, therefore, all the more important to bear in mind the possibility of an underlying bronchial carcinoma[6 14] or foreign body, and it is probably wise to carry out bronchoscopy in all cases irrespective of the initial response to treatment.

OBSTRUCTION OF THE SUPERIOR VENA CAVA

THE superior vena cava is most often occluded by external pressure from malignant tumours or aortic aneurysms, and when such lesions are present it is neither reasonable nor possible to try to relieve the obstruction by operation. But sometimes the obstruction may be the result of a more benign process, such as phlebitis, chronic fibrosing mediastinitis, or mediastinal tuberculous lymph-glands. Although many patients with an obstructed superior vena cava have no symptoms, the rise in venous pressure may cause persistent cyanosis, swelling and venous engorgement of the head and neck, and severe headaches and dyspnœa. For these patients operation may be indicated. Replacement of the great veins presents problems different from those of arterial grafting. The venous wall is thinner and more compressible; and the blood flows more slowly and at a low pressure. Consequently any disparity in length or diameter results in angulation or ridging of the graft; and this may lead to thrombosis, particularly at the suture line.

Deterling and Bhonslay[15] have replaced the superior vena cava in dogs by various materials. Aortic homografts, they found, were easy to handle and suture into place, although within a few weeks of insertion the graft shrank to an elliptical cross-section with internal furrows and corrugations. They say the functional results were reasonable even though the diameter of the graft was eventually reduced by 40%. Venous autografts worked very well at first; but all of them were completely occluded by thrombosis within a month. Synthetic materials were even more disappointing and none of those tried, including 'Ivalon' sponge, 'Dacron' taffeta fabric, and woven seamless nylon, functioned satisfactorily. In the patient they treated, who had complete caval and azygos obstruction by tuberculous glands, the thrombosed segment was resected and replaced by an aortic homograft. This has worked well for eighteen months and the patient's symptoms have been completely relieved. This is the 9th case so far reported in which a superior-vena-caval obstruction has been treated by grafting. In 6 of these the venous autograft either thrombosed after operation or was described as a "partial" success. After the other 3 operations, in which aortic homografts were used, 1 patient died four months later, at which time the graft was patent, and 1 graft was a failure; the 3rd is the case described by Deterling and Bhonslay. They rightly conclude that this generally unsatisfactory picture underlines the need for further investigation into large-vein-replacement.

CUTANEOUS LYMPHATICS

THE part played by lymphatics in vascular diseases of the legs continues to interest clinical investigators. Butcher and Hoover[1] have studied the abnormalities of cutaneous lymphatics associated with stasis ulcers, lymphœdema, and cutaneous autografts. Their method was essentially that of Hudack and McMasters[2]; sky-blue dye (in aqueous 4% solution) was injected through a 30-gauge needle into the most superficial layer of the dermis. The spread of the dye locally can be recorded photographically, and massage and movement of the foot or leg drives the dye proximally to the collecting lymphatics and glands. Butcher and Hoover found that the patterns of superficial dermal lymphatics in the extremities of normal individuals showed little variation in length, diameter, or number of channels and that the pattern was more difficult to demonstrate in thin skin. Similar forms of lymphatic spread were seen in the skin around uncomplicated varicose veins; in the presence of cutaneous pigmentation the lymphatics were dilated and the dye diffused more rapidly through these walls. After a stasis ulcer had developed the lymphatic network in the surrounding skin failed to fill, although Kinmonth[3] demonstrated patent lymphatics in the deep tissues underlying stasis ulcers. It is hard to decide whether the lymphatics are obliterated immediately before the ulcer forms or whether the obliteration follows infection and sclerosis secondary to the ulcer.

Superficial lymphatics were also observed by the dye method in 22 partial-thickness skin-grafts in the leg. The channels in the donor skin persisted in a dilated form for three to six months after the grafting, but with longer intervals the calibre of the lymphatics seemed to return to normal in the skin which remained pliable and normal in texture and colour. In contrast, lymphatic channels could not be identified in the scaly, weeping, and pigmented grafts. Many connections between the lymphatics in the satisfactory grafts and those of the skin around became obvious two to four months after grafting. These findings suggest, according to Butcher and Hoover, that the establishment of lymphatic channels between the donor and host skin is of considerable importance and where this fails successful resurfacing cannot take place. The corollary to this is that excision of an ulcer prior to grafting must be wide enough to include all tissues in which lymphatics have been obliterated.

Lymphatics could not be demonstrated by Butcher and Hoover in the involved skin of patients suffering from lymphœdema præcox—in striking contrast to the findings of Kinmonth and Taylor[4] that a network of abnormally dilated lymphatics could be consistently outlined after intradermal injection of patent blue V. Kinmonth and Taylor exposed the distended channels and injected X-ray contrast media, which displayed the

9. Rubin, E. H., Goldstine, S. A., Rubin, M. *Med. Clin. N. Amer.* 1949, **33**, 391.
10. Bickerman, H. A., Stone, J., Schilard, A. J. *Amer. J. Med.* 1950, **8**, 263.
11. Eastlake, C. jun. *Bull N.Y. Acad. Med.* 1950, **26**, 423.
12. Métras, H., Lieutier, J. *Thorax*, 1947, **2**, 196.
13. Burnett, W. E., Rosemond, G. P., Caswell, H. T., Hall, J. J., Bucher, R. M. *Penn. med. J.* 1949, **52**, 719.
14. Brock, R. C. *Guy's Hosp. Rep.* 1948, **97**, 75.
15. Deterling, R. A. jun., Bhonslay, S. B. *Surgery*, 1955, **38**, 1008.

1. Butcher, H. R. jun., Hoover, A. L. *Ann. Surg.* 1955, **142**, 633.
2. Hudack, S., McMasters, P. D. *J. exp. Med.* 1933, **57**, 751.
3. Kinmonth, J. B. *Clin. Sci.* 1952, **11**, 13.
4. Kinmonth, J. B., Taylor, G. W. *Ann. Surg.* 1954, **139**, 129.

extension of dilated and incompetent lymphatics up to the root of the limb. It is possible that all patients with lymphœdema præcox have, before the advent of the cellulitis and lymphangitis to which they are so prone, a dilated and incompetent lymphatic system. The subsequent infection, mainly by the streptococcus, obliterates the lymphatic channels and so prevents their demonstration by dye techniques. This interpretation could well reconcile the different findings. An alternative explanation is that both absence and incompetence of lymphatic channels cause tissue fluid to accumulate and either abnormality may be associated with the clinical picture recognised as lymphœdema præcox.

It is becoming clear that the skin and deeper lymphatics are often involved in a variety of vascular diseases. So far this has not greatly influenced treatment, but the knowledge is interesting in itself and may lead to therapeutic advances.

ABRASION TREATMENT OF ACNE SCARS

THE pimples of acne vulgaris are bad enough as a temporary embarrassment, but the scarring that can follow is a much more serious and permanent disfigurement. A great deal of this may be prevented by persistent treatment under experienced supervision; but many cases of acne are neglected because the complaint is almost physiological in adolescence and usually clears up spontaneously. In the past, a number of different forms of treatment for acne scars have been suggested, each amounting to some means of superficial destruction of the skin. Painting with liquid phenol, followed by "neutralisation" with alcohol, seemed to carry such a disproportionate risk of poisoning that it never became popular. Abrasion with sterilised carpenters' sandpaper [1] began a new vogue which has largely been abandoned for fear of foreign-body reactions from implanted silica. A refinement of the method is to use rotating abrasive discs or emery wheels. A form of mechanical abrasion was suggested as long ago as 1905, when Kromayer [2] introduced small rotating burrs and cylindrical knives for this purpose. A modern development has now become so popular in the United States that complete kits for "dermabrasion," as it is called, are widely available. The special features of the method [3] include the use of an electric motor producing 12,000 r.p.m., a range of small wire brushes held with the axis of rotation at right angles to the surface of the skin, and refrigeration with ethyl chloride, which serves both as local anæsthesia and skin-hardener. Rapid evaporation of the ethyl chloride is maintained by a continuous stream of air. 'Freon 114,' which is dichlorotetrafluoroethane, has recently been used [4] instead of ethyl chloride, because it is said to be non-toxic, it is non-inflammable, and it is not an anæsthetic on inhalation.

Some reports of the results of this treatment were very enthusiastic and were given wide publicity in America. One report said that the results are so good that no patient should be refused treatment. The American Medical Association's committee on cosmetics called for a report on the method, and this was prepared by Rattner and Rein.[5] They state that a high degree of cosmetic repair can be obtained in some cases, but "the results of treatment are usually good rather than dramatic" and they are unpredictable in an individual case. The commonest complaint—namely, "dilated pores"—cannot be improved, nor can very wide or deeply pitted scars be greatly modified. Their own experience has led them to advise against this treatment in 40–60% of those applying for it. Disastrous results have been rare. Small horny inclusions or milia form a common but temporary complication. Infections have not been troublesome, but in some cases erythema or pigmentation has persisted for some months after treatment. Some slight scarring has been seen, but this has responded to further abrasion and no cases of keloidal scarring have been reported. This absence of scarring is perhaps the most surprising feature of the method. One paper [6] insists that it is possible "to plane down almost to subcutaneous fat and still have noncicatricial healing."

There are only a few places in this country where this treatment is being tried, and it is unlikely that it will ever become a routine matter in our dermatological outpatient departments. It seems to be a method of value for selected cases of scarring from old acne, chickenpox, or other causes. Less enthusiasm is likely for some of its suggested uses, such as the treatment of pigmented lesions and keratoses where histological control is desirable. The treatment may be most sought after by patients for whom anything short of miraculous restoration would be inadequate, and who are perhaps rather obsessional about their appearance. Indeed, it is in the selection of cases that Rattner and Rein urge most caution. It has long been a dermatological paradox that those most seriously blighted by skin disease seem least concerned with their appearance: the victims of what are now old-fashioned degrees of lupus vulgaris were often less apparently perturbed than the young man with relatively insignificant scars of acne.

1. Iverson, P. C. *Plast. reconstr. Surg.* 1947, **2**, 427.
2. Kromayer, E. *Derm. Z.* 1905, **12**, 26.
3. Kurtin, A. *Arch. Derm. Syph., Chicago*, 1953 **68**, 389.
4. Wilson, J. W., Lulkart, R., Ayers, S. *Ibid*, 1955, **71**, 523.
5. Rattner, H., Rein, C. R. *J. Amer. med. Ass.* 1955, **159**, 1299.
6. Robinson, M. M. *Med. Ann. D.C.* 1955, **24**, 17.

FAT AND FERTILE

IN a contribution to the proceedings of the Third International Congress of Nutrition, Widdowson [7] made some stimulating comments on reproduction in relation to obesity. She stated that fat women (whether prediabetic or not) had large fat babies who grew big, reached an early puberty, still ahead of the field, and in due course completed the cycle by becoming fat mothers. The additional risk which their obesity conferred in pregnancy (largely that of toxæmia) was compensated in the puerperium by the facility with which they fed their children; for the large women with large breasts produced more milk than their slender sisters, even to the extent of having lactorrhœa.[8] It is safe to say that much of this is in opposition to what many clinicians believe. Thus, it is widely held that the fat child is likely to be sexually immature, or late to mature. Spence,[9] discussing obesity accompanied by delay in the onset of puberty, noted that nearly all these patients were suffering from simple obesity (though a craniopharyngioma had to be excluded). Yet there is now much evidence which seems to refute the very existence of such an association. Wolff [10] has published the most recent of several studies all of which suggest that the obese girl reaches puberty no later and probably earlier than normal. The opposite impression may have grown from wide acquaintance with the rare but more publicised endocrine disorders associated with the names of Fröhlich and Cushing, and also from a knowledge that obesity and hypomenorrhœa are commonly associated in young adults. At least, such evidence as there is (and there is little) goes to show that women with simple obesity may often have amenorrhœa which can be relieved by weight reduction. Swyer [11] described irregular or scanty periods in overweight women, in whom restriction of diet restored menstrual regularity and improved fertility. From a different approach, Rogers and Mitchell [12] found that a

7. Widdowson, E. M. *Amer. J. clin. Nutr.* 1955, **3**, 391.
8. Sheldon, J. H. *Lancet*, 1949, ii, 869.
9. Spence, A. W. *Practitioner*, 1952, **169**, 260.
10. Wolff, O. H. *Quart. J. Med.* 1955, **24**, 109.
11. Swyer, G. I. M. *Brit. J. Nutr.* 1949, **3**, 100.
12. Rogers, J., Mitchell, G. W. *New Engl. J. Med.* 1952, **247**, 53.

significantly high proportion of young women with secondary amenorrhœa could be classified as obese.

There is no good reason to believe that fertility commonly suffers when a woman gains weight *after* childbirth. In a study of parous obese women, Odell and Mengert [13] recorded an average parity of 4·5 (which they thought high) among their patients at the time of interview; and Sheldon [8] found no evidence of menstrual upset (or of infertility) among a group of women complaining of obesity following pregnancy. Certainly many women who become very fat after pregnancy have unimpaired fertility, but this is not true for all. It is impossible to progress further without recognising different clinical groups of obesity. "Simple obesity" [14] is certainly not always simple, although it may not fall into the category of any of the grosser endocrinopathies. Sheldon [8] found two distinct groups amongst his patients, one of which appeared to be the pre-diabetic group; and there may well be other clinical subgroups. If hypothalamic disturbance (which can be of psychogenic origin) causes obesity by promoting excessive appetite, then it is reasonable to suppose that a secondary pituitary upset may cause gonadal failure in these women. Thus, it is probable that, with advancing knowledge, more and more cases of "simple obesity" will fall into the category of true endocrinopathies, and Widdowson's views on reproduction and over-nutrition may be confirmed.

PLAIN RADIOGRAPHY OF THE INTESTINE

WITHIN twelve hours of the birth of a normal infant, air has become dispersed through the entire length of the gut,[15] and thereafter in health it is never entirely absent. Some gas is nearly always found in the fundus of the normal stomach, in the colon, and in little collections in the small bowel. Because of its low radio-opacity it forms an excellent natural contrast medium. In intestinal obstruction, straight radiographs of the abdomen can give valuable information about the site and sometimes the nature of the obstruction. The bowel below the level of the obstruction soon becomes empty of gas, while the loops above become distended with gas and fluid. In lower ileal obstruction, distended loops of small bowel form a step-ladder pattern across the abdomen, and the colon is collapsed and empty of gas. When the obstruction lies in the colon, it may be hard to distinguish distended colon from distended small bowel, but generally the lateral position and deep haustra of the colon can be separated from the thinner and more frequent folds of the ileum or the still more feathery pattern of the jejunum. The higher the obstruction, the less the radiological signs, especially if vomiting keeps the bowel empty.

X-ray examination cannot exclude strangulation of the gut, but Frimann-Dahl [16] has pointed out that in a strangulated loop only sanguineous fluid collects, and the loop may be visible as a rounded tumour-like mass set amongst gas-filled gut. Should the volvulus be incomplete, gas can enter the loop and give the "coffee-bean" sign of Rigler. The gas shadows sometimes serve to show the nature of an obstruction due to internal herniation: distended crescentic loops of bowel in the right-hand side of the abdomen point to herniation into the lesser sac. Gallstone ileus produces the triad of gas in the biliary tree, small-bowel distension, and the faintly calcified shadow of a large stone in the terminal ileum. In paralytic ileus both large and small gut are dilated, and X-ray examination is helpful here in excluding obstruction of the small bowel, so that conservative treatment can be pursued with greater confidence. The progress of intubation and decompression can then be followed on serial films. In peritonitis, exudate may separate the loops of gut and the properitoneal fat lines disappear. Localised abscesses—e.g., from an appendix—may be outlined by gas-filled bowel. In ascites the gut floats on top of the fluid when the patient is erect, and the density of the lower abdomen is much increased by large effusions. When the gut has perforated, it may take some time for air to percolate upwards and become visible below the diaphragm in films taken with the patient upright; and in ill patients a supine lateral film will show gas between liver and anterior abdominal wall.

Straight radiography of the abdomen is particularly valuable in children, in whom the gas shadows are often more pronounced. In the newborn it may give valuable clues to the malrotations and atresias [17]; and the length of the stenosis in imperforated anus can be estimated. Signs of small-bowel obstruction in an otherwise normal abdomen may point to meconium ileus; and the faint intraperitoneal calcifications of meconium peritonitis may be detected. In an "acute abdomen" the cautious administration of lipiodol to a child (or barium to an adult) is not now regarded with the same disquiet as it used to be, and this move will often provide valuable additional information.

DEATHS DURING ANÆSTHESIA

THE report of the Ministry of Health for 1954 records [18] that the number of deaths during anæsthesia in England and Wales has declined year by year since 1938. In 1953 there were 562 deaths, 284 of them in men and 278 in women, or about 1 per 1000 of all deaths in the population. These figures cannot be accurately related to the total number of anæsthetics given in the same year, for which there are no recorded statistics, but in 1954 the Ministry made a pilot survey which showed that about 8 million anæsthetics were administered during that year in the hospitals of England. Though the over-all figure for deaths is declining, for patients over the age of 65 there is an upward trend. This is perhaps not surprising, particularly in view of the fact that more major operations are being carried out on older people. It is, moreover, in accordance with the findings of Beecher and Todd,[19] who recently investigated the mortality due to anæsthesia in ten teaching hospitals in the United States. Wisely, no attempt has been made to correlate particular agents or techniques with mortality (indeed, it would not be fair to do so with the data available), but it is interesting to note that thiopentone alone was mentioned on the death certificates in 314 anæsthetic deaths in the period 1949–53.

The Ministry's report gives grounds for satisfaction, and it reflects how successfully anæsthetists have advanced their specialty in the post-war years. Nevertheless, some may ask whether these figures really do tell the true story. Sudden death due to anæsthesia rarely gives rise to specific post-mortem findings, and, as the report points out, the only person who really knows the cause of an anæsthetic death is the anæsthetist who gave the anæsthetic. Useful results are likely only from a well-planned investigation, such as that organised by the Association of Anæsthetists of Great Britain and Ireland, with detailed and first-hand accounts of the actual occurrence.

Prof. ARTHUR FELIX, D.SC., F.R.S., director of the International Enteric Reference Laboratory in London and long a member of the staff of the Lister Institute, died on Jan. 14 at the age of 68.

Mr. WILSON HEY, consulting surgeon to Manchester Royal Infirmary, died on Jan. 15 at the age of 73.

13. Odell, L. D., Mengert, W. F. *J. Amer. med. Ass.* 1945, **128**, 87.
14. Richardson, J. S. *Postgrad. med. J.* 1952, **28**, 618.
15. Paine, J. R., Nessa, C. B. *Surgery*, 1942, **11**, 281. Wasch, M. G., Mark, A. *J. Pediat.* 1948, **32**, 479.
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Points of View

A MATTER OF SCIENCE AND ETHICS

Reflections on the B.M.A. Committee's Report on Homosexuality and Prostitution *

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THE Departmental Committee now taking evidence on the laws which affect homosexuality and prostitution is a potentially important body. In the legal interpretation of sexual behaviour the psychological and biological sciences have for some years been increasingly persistent interrupters from the floor, and this committee is one of the first, in England, to invite them, together with their opponents, on to the platform. Like most interrupters so treated, some workers who have much to contribute to the subject have fallen silent: many of them have scientific scruples against presenting as evidence what they know to be only opinion. But this is a field where the law has long been formed by disturbed minorities, and these scruples are not shared by the opponents of social science.

The most important testimony which the committee requires to consider comes, in all probability, not specifically from medicine, or even from psychiatry as it is usually understood, but from comparative human biology on the one hand, and the social psychology of prohibitive legislation on the other. But medicine has a number of important comments to make: and doctors—who should, no doubt, be both human biologists and social psychologists—have a chance of being heard on the occasions when "scientists" are being shouted down by common-sense, practical geoplanarians appealing to the self-evident. As there will be no lack of Wilberforces in any such debate, it is clearly someone's business to accept the unpleasantness of being a Huxley.

A number of medical bodies are, in fact, giving their views. One of these is a special committee set up by the council of the British Medical Association. It has just made public the evidence which it proposes to submit, in the form of a report, accompanied by some well-calculated publicity.

There are two reasons which make this document worthy of separate discussion. The first is political. A report endorsed by the B.M.A. might easily turn out to be a microcosm either of the departmental committee's ultimate findings, or of future legislation. The considered views of such professional bodies have great attractions for politicians facing unpopular topics: the B.M.A. is a conservatively inclined body with a high lobbying potential, which can be set as the exponent of the practical and human in contrast to the extremist or "egg-headed" conclusions of science. There is nothing in its title or record to alarm the most disturbed or anti-intellectual Member of Parliament; he may never have met a social anthropologist, but he has often met a doctor or two. A Minister forced to advocate some changes in the law, unwilling to make many, and faced with an organised and paranoid minority campaign against any at all, will look instinctively for a body, quotable in support of his intention, to which the word "responsible" can be applied.

One reason for the importance of the report, then, is that it could provide an opportunity for intelligent medical opinion to comment on the basis of new knowledge, and to encourage the reform of laws which are widely held to be bad. There is, however, another. Under the influence of modern research and thought, the psychology of law and government is undergoing changes as radical as is the psychology of individual behaviour: science is beginning to assume the duty of replacing political ideology with research. Our own generation has before it two excellent object-lessons in the interplay of emotion, fact, reason, and prejudice in legislation, and of the relation between law-making and personality structure: one is the attempt to abolish the death penalty, and the other the attempt to reform the law regarding sex offences. In each case there are superficially substantial arguments on both sides; in each case there is intense emotional motivation on both sides; and in each case there are signs of a bimodal distribution of opinion by personality type, one type being commoner among legislators and executive officers, the other among social scientists. This is a fascinating and important study—terrifying to those who think that legislatures can be trusted to accept expert advice, or that experts can be trusted to govern. It is therefore intensely interesting to see how medical opinions, official and unofficial, scientific and administrative, distribute themselves on this scale. In this respect, the B.M.A.'s committee is offering itself for study by its sociological colleagues.

* * *

A report of this kind was bound to be difficult to write. One source of difficulty is evident if we compare the two matters with which it was to deal. Prostitution is a practice which may offend; but its discussion disturbs only those who are disturbed by sexuality in general. Its control, and even its merits, can be, and have been, discussed with a realism bordering on the cynical. Homosexuality is quite another matter. The reaction of our culture to it is so violent, and so disproportionate to any demonstrable importance of the behaviour concerned, that even if a committee is itself quite unaffected by this reaction (an unlikely event, if it is representative) it is bound still to decide how much insight it ought to try to give to those it addresses. It could be argued that since doctors have no special claim to be arbiters of the *mores* of their culture, rational or irrational, such a committee should take the public attitude as it finds it. This view, very properly, the committee rejects: "Doctors," it says, "can influence, by instruction and example, the development of the moral and social environment of their patients, and discourage them from behaviour which may adversely affect their health." They will do so, no doubt, both from their own common sense and from any special insights they derive from the discipline of human biology. In valiantly assuming this duty to an emotionally loaded subject, however, the Committee undertakes the responsibility both of showing what those insights are, and of writing intelligently about their application to ethics; and it has clearly found this no light assumption.

This report had the opportunity of doing three things—of indicating the weaknesses and inhumanities of the present law regarding homosexuality, which it does with some success; of showing how modern social

* The report was issued on Dec. 16, and a long summary appeared in the Supplement of the *British Medical Journal* for Dec. 17, 1955. It was prepared, as a memorandum of evidence for the Departmental Committee, by an expert committee (set up by the council of the British Medical Association) whose members were Dr. RONALD GIBSON (chairman), Dr. T. H. BLENCH, Dr. DENIS CARROLL, Dr. T. C. N. GIBBENS, Prof. J. GLAISTER, M.D., Mr. AMBROSE KING, F.R.C.S., Dr. J. A. MOODY, Dr. DORIS ODLUM, Dr. T. P. REES, Dr. S. L. SIMPSON, and Dr. R. D. SUMMERS, with Dr. E. E. CLAXTON as secretary. On Nov. 4 the council of the B.M.A. agreed that the memorandum should go forward as the report of the committee, for on so controversial a subject it was not to be expected that the profession or any large body within it could be in agreement in detail.

and biological studies affect their attitude to it; and of giving an exemplary study to its patients in the application of science and logic to an ethical problem. Most of my comment here will deal with the committee's views on homosexuality—in part because modern knowledge has added remarkably little to our attitude towards prostitution, and because (judging from the past) no law or recommendation is likely to have any significant effect upon any but the most obviously professional form; but chiefly because it is society's attitude towards homosexuality which calls most urgently for revision today.

* * *

It seems to me that a distinguished committee has worked hard, has tried to set a moral and social example, and has made a number of humane and sensible suggestions, and simultaneously, by the language of some passages of its report, has thrown away an opportunity which will not soon recur. It has dissipated any chance of serious ethical discussion in a series of pontifications. Doctors, the Departmental Committee may conclude, are no different from the rest, though they express their prejudices in longer words. This is a disappointing conclusion, even if it might have been expected: it is instructive, however, because the striking discrepancy of tone between the scientific and the exhortatory passages of the report suggests that even on an expert committee there has been a distribution of function exactly like that in society as a whole. The report reads as a dialogue between a sensible psychiatrist of conservative opinions, and an *alter ego* of a very different kind. The scientific have said their say, but the final document gives a strong impression that it has been written in its rhetorical passages by a single person of definite and restrictive opinions.

> "At the present time doctors observe their patients in an environment favourable to sexual indulgence, and surrounded by irresponsibility, selfishness and a preoccupation with immediate materialistic satisfaction. There is also no lack of stimulation to sexual appetite. Suggestive advertisements abound . . . provocative articles appear in the daily, and especially the Sunday, newspapers . . ."

That paragraph could not, I think, have been the work of a committee, and most of the report's ethical comment bears tokens of the same hand. There is a strong suggestion throughout that if deviant sexual behaviour is wicked, its wickedness depends on the same factor which made the Puritans, according to Macaulay, object to bear-baiting: the hypothetical writer is one who would never use the word "enjoyment" where he could substitute "indulgence."

The psychiatric members of the committee, who have done their job well, would probably agree that public reaction to homosexuality has a close affinity with the psychology of anti-Semitism, and with the pursuit of heretics who menace the tribal magic. Such thinking is possibly the result of people's overreaction against components in their own make-up; and it could well be argued that the presence of individuals overreacting in this way in the various organs of society, especially Parliament and the courts, is more harmful in the long run than that of conscious and practising exponents of the hated behaviour whose existence the committee has earned notoriety by stressing. For homosexuality this stream of disturbed opinion has created a characteristic terminology, based on typically adrenergic words such as: "unnatural vices," "moral fibre" which is sapped, and "unmentionable" practices which are indulged in.

Quite the worst feature of the B.M.A.'s evidence is that it has bodily taken over this diction. The conspiratorial atmosphere is maintained by repetition of words like "insidious," "corruption," "perverted," "indulgence." (We even encounter the expression "homosexuals and their sympathisers," which brings to mind the disclaimer in press correspondence denying that the writer is a Communist or a Communist sympathiser. Some such equivalent phrase may soon be required in medical articles.) The general tendency of this diction is to reverse the sense of the scientific evidence, and to counter any emotional disinflation of the subject. That a predominantly psychiatric and scientific committee should let itself be reported in such language is frightening.

* * *

The committee might, perhaps, properly reply that whatever they had said they would have failed to satisfy all shades of extremist opinion, and that if persons who are neither psychiatrists nor engaged in research on human behaviour feel that the report's recommendations are misguided, they should send their views to the Departmental Committee. This is fair enough, perhaps: yet a report which is made in the presence of such an opportunity as this, and which welcomes with both hands the chance to combine science and ethics, does invite public comment. Moreover it is not the recommendations of the B.M.A. special committee which are disappointing: most of them are, as I have said, humane and sensible; and they probably do in fact represent a modal average of medical opinion in this country. The disappointing feature of the report is far less its matter than its manner. Its failure is almost wholly one of attitude, and much of it lies in the presentation—often the verbal presentation—of what the committee has to say.

As a contribution to healing it incurs three charges: first, it is couched in language which throws away the fundamental point of difference between the medico-scientific approach to unpopular sexual behaviour and that of society, or the Sunday Press. Secondly, its discussion of scientific data is skeletal, the bones being apparently chosen to avoid dangerous thoughts, but clothed in a great deal of moral adipose tissue. And thirdly, it offers no single comment on either of the two aspects of homosexual conduct which medicine is almost alone qualified to discuss—the reality of the moral and physical ill effects on individuals and society which might justify prohibiting it, and the psychosocial origins of the attitude which society adopts toward it. I do not think these are unfair criticisms: at least they provide as good a peg as any upon which to hang a discussion of the responsibility of medicine for giving insight to public opinion.

Neither is the committee much happier in its encounters with biology, although the scientific sections are gratifyingly written, from the standpoint of diction and attitude, "in another hand." It provides no adequate review of the literature, and the bibliography contains six references, though other work is quoted in the text. Its brush with genetic determinism is important; for the "essential" homosexual, real or imaginary, is a potentially important intruder in legislation. Beside his popularity with predominantly homosexual individuals, who share the general comfort which we derive from "organic" explanations of our peculiarities, he could very easily acquire a legal status according immunity to himself and continued punishment to others who cannot prove their activities to be "essential" rather than merely experimental.

There is one scientific omission, moreover, which cannot be overlooked. "Homosexual" behaviour is presumably the display, between individuals of the same sex, of an imitation of reproductive mating behaviour, which may or may not end in some kind of sham copulation. It occurs under ordinary conditions of observation almost universally among immature and segregated, and not uncommonly in adult unsegregated, males of most if not all mammalian species, as well as in other bisexual organisms. Similar behaviour has been described between human males in every culture of which we have record, without any obvious psychotic

or endocrine correlations. The reactions of these various cultures range from complete toleration to intense emotional disturbance, and from admiration to severe punishment for individuals so behaving. Similar behaviour between females, however, only exceptionally evokes any intense reaction.

At no point does the B.M.A. report mention this comparative background. Yet the comparative study of sexual behaviour in man and animals is perhaps the fundamental contribution of modern biology to this whole question. A summary of mammalian work, or even an account of the attitudes of some other human societies, would probably have been more useful to the Departmental Committee than a long appendix describing the effects of evangelism on homosexual persons, while the lack of any paragraph dealing with phylogeny makes nonsense of a good deal of the discussion of causation: neither genetics, endocrine imbalance, nor processes of parent-identification contribute detectably to the causation of homosexual play between dogs, sticklebacks, or rats, so far as the literature indicates—though they may begin to do so in higher primates, the complexity of whose sexual behaviour forshadows our own. One might punish these lower animals, but there would be little point in consulting a veterinary surgeon about their behaviour.

* * *

But the real importance of comparative studies is in their effect on our attitude, and I suspect that it is for this reason that they have been omitted.

If the authors of the report were tired of ethical judgments on human behaviour drawn from white rats and Trobriand islanders, they have most reasonable men on their side. Comparative and descriptive studies in animals or in man have no direct ethical meaning. The distribution of homosexuality in mammals and in cultures is not very different from that of fights-to-the-death between males as a feature of mating behaviour, yet only the German duellists of the 1930s invoked phylogeny to prove the natural merit of this kind of competition. Nevertheless a background of comparative study does and should condition our response, and that of the Departmental Committee, to the magical propaganda regarding the unnatural, the diabolistic, and the loathsome, which plays such a large part in preventing the sensible discussion of sexual deviations, and even of the normal range of sexual behaviour. However harmful to society homosexual behaviour may be in man, the biologist, surrounded day in and day out by the homosexual activities of his healthy laboratory animals, finds it hard to muster convincing indignation at its unnaturalness.

It would, I think, have been extremely valuable to the Departmental Committee's judgment—and, for that matter, my own—if this report had included a serious discussion of evidence that homosexual conduct has, in fact, social or psychiatric ill effects other than those due to the reaction it evokes in society: in societies which encouraged it, did it become a self-propagating emotional disability? If, as the B.M.A. Committee believes (on evidence of the kind which has so long bedevilled the attempt to trace an authentic instance of instinct in human psychology) there are "essential" homosexuals, is it beneficial to their mental health to prohibit or discourage their activity? Does the same apply to persons who display both homosexual and heterosexual behaviour? Many would think that psychiatrists with a sufficiently wide comparative insight are among the people best qualified to answer these questions.

The committee says that it proposes to base its advice in ethical matters upon the effects of behaviour upon health and welfare: it also devotes much time to the administrative arrangements for treating homosexuals instead of punishing them. The evidence its presents tends to indicate (1) that in man, apart from the supposedly "essential" cases which it postulates, homosexuality is, like heterosexuality, a continuously distributed variable, and (2) that while its association with certain forms of psychological upset is evident in many of the individuals who come for treatment, there are probably circumstances under which it is no more a psychiatric problem than any of the wide range of sexual manifestations which may be displayed by "normal" human beings. In regard to homosexual play between adolescents, the committee takes this view: it also lays stress on the need to assess each case upon its merits. There is, I believe, no virtue in treating people for symptoms which are not pathological or in punishing them savagely for crimes which are of no social importance; and there is a risk that the courts will grudgingly accord treatment to subjects who engage in homosexual behaviour and are mentally disturbed about it, while discharging the whole weight of frustrated righteousness on those who are not. It is not so long, after all, since adolescent masturbation was solemnly quoted as a cause of mental disorder, blindness, and pimples.

* * *

Medicine could help at this point, if it were willing to risk some legislative unpopularity, by pointing out the differences between public law and personal ethics. The B.M.A.'s committee has felt itself unable to recommend that homosexual offences involving neither violence, scandal, nor seduction should be recognised as outside the province of the law. It may be right in this, but I cannot help feeling that its views would have been more respected if their presentation and logic had been less confused in the ethical passages of the report. Perhaps the crux of the matter lies in the committee's own summary:

> "The apparent increase in homosexual practices and in prostitution is attributable to the weakening of the sense of personal responsibility with regard to social and national welfare in a significant proportion of the population. It is illogical that homosexual practices receive greater condemnation than promiscuous heterosexual intercourse."

One could equally argue that there is a sense in which the increase, if real, represents the reverse of such a weakening, because the climate in which it occurs has sprung largely from the impact of new knowledge on society, leading to a rejection of pontifical and magical regulations upon conduct, and a search, often very confused and beset by rationalisations, for reasons for or against particular modes of behaviour. The teen-age boy or the grown man who is no longer disturbed by the memory of a homosexual experiment has not, unless he is exceptional, read widely in comparative social anthropology, though he may have read Kinsey, or a distortion of Kinsey's findings in the Sunday Press. His lack of disturbance is, to my mind, a gain rather than a loss to the mental health and morale of the future.

I suspect that the author of the passage dealing with salacious posters would even the discrepancy between homosexual and heterosexual offences by increased punishment of the second. Others would incline to do so by presenting to public opinion rational grounds for responsible sexual behaviour. It is not surprising if doctors, like the rest, are confused between these two views: they represent two kinds of person, at least as different in their reactions as are homosexual and heterosexual individuals, and probably determined in much the same manner, genetic and environmental. There may even be "essential" punishers and prohibitors. But we should bring the existence of this confusion of counsel to the notice of others explicitly, not implicitly, if our professional sincerity and insight are to be respected.

Special Articles

TOO MUCH BARBITURATE?

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DEATHS in England and Wales due to poisoning by barbituric acid and its derivatives have increased considerably in recent years, until in 1954 they numbered 575. From 1939 to 1945 the annual variation in the number of deaths was small and suicides were not greatly in excess of accidental deaths, the yearly average being :

Suicides ..	Males	16	Accidental deaths ..	Males	12
	Females	27		Females	19

From 1946 onwards there has been a signal increase in all four groups, shown in table I and fig. 1.

The average numbers of male and female suicides by barbiturates during 1952–54 were respectively 9·0 and 7·3 times the average for 1939–45; the corresponding figures for accidental deaths were 5·7 and 5·0.

During the sixteen years since 1939, the crude suicide-rates for both males and females, when all methods of committing suicide are considered, have tended to oscillate rather than to show a definite upward or downward trend (table II).

The rates for barbituric acid poisoning, however, after remaining fairly uniform up to 1945, have since shown a somewhat rapid upward trend. While male total suicide-rates have been consistently in excess of female, the female rates for barbiturate poisoning have been higher than the male from 1943 onwards. It seems that a preference has been shown lately for using barbiturates as suicidal agents, rather than some other lethal means.

On the assumption that different agents would be used in the same proportions in subsequent years as in 1945, the numbers of suicides expected to be due to each agent have been calculated for 1947, 1950, and 1953, and these "expected" numbers, compared with the actual numbers, are shown in table III.

Whereas the number of suicides due to barbiturates might have been expected, on the 1945 basis, to increase by 1954 from 20 to 28 for males and from 35 to 46 for females, the actual increases were from 20 to 161 and from 35 to 230 respectively. In 1947 the numbers who used other analgesic and soporific drugs exceeded the expected number, but in 1950 and 1954 the actual numbers were considerably less than anticipated. Gas poisoning was also used more frequently in the later years than expected, whereas the numbers of deaths due to the more violent methods—hanging, drowning, shooting, and the use of cutting instruments—were all less. It appears, therefore, either that the tendency is for the more active and violent methods of suicide to be abandoned in favour of the more passive methods of barbiturate or gas poisoning, or that an actual reduction has occurred in the suicide-rates from more violent methods, but has not been accompanied by a decrease in the rates for barbiturate or gas poisoning. Table IV shows the variation in suicide-rates between 1944 and 1954 according to the means used.

The medical officer of health for Hampstead, Dr. Geffen,[1] commenting on the suicide-rates in his Metropolitan borough, made some apposite remarks. Investigating the high suicide-rate of 1950, he found that, of 86 suicides during 1950–53, 23 used barbiturates. He suggests that "some steps should be taken to prevent the ease with which the public can obtain dangerous medicines in lethal quantities." He does not think that "the person who has made up his mind to commit suicide will sooner or later do so" but that "it is likely that the presence of a fatal drug, or an easy means of terminating his life, may cause him to take a fatal step at a time when temporarily his mind is unbalanced."

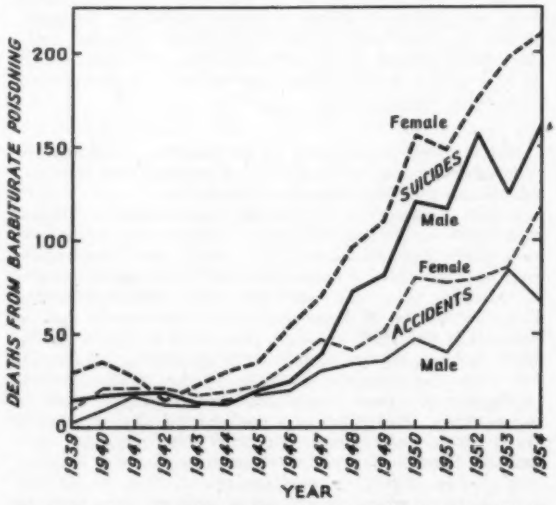

Fig. 1—Number of suicides and accidental deaths from barbituric acid poisoning, 1939 to 1954.

Dr. Geffen also alludes to "fashions in suicides" which may be influenced by publishing accounts of the methods used. Coal-gas is usually readily available, and, while barbiturates are not freely sold to the public, it will be seen below that they are frequently prescribed under the National Health Service. The increase in the suicide-rates by these two methods, when rates in which other

1. Geffen, D. H. Report on the Health of the Metropolitan Borough of Hampstead, 1954.

TABLE I—NUMBERS OF DEATHS FROM POISONING BY BARBITURIC ACID AND ITS DERIVATIVES, 1939–54 *

—		1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
Suicides	M	14	17	18	19	13	13	20	24	39	73	81	122	100	157	124	161
	F	29	35	27	14	22	30	35	54	70	96	110	156	148	176	197	230
Accidents	M	3	9	17	13	12	15	18	20	30	34	36	47	40	61	84	67
	F	10	21	21	21	17	19	22	34	47	41	51	80	77	79	85	117

* Data from the Registrar-General's Statistical Review, 1954, Part I. Tables (Medical).

TABLE II—CRUDE SUICIDE-RATES PER MILLION LIVING FOR (1) ALL AGENTS, (2) BARBITURIC ACID POISONING, 1939–54

—		1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
All agents	M	168	159	135	125	134	135	136	144	137	145	147	136	135	132	142	149
	F	78	75	62	62	63	58	66	75	76	79	75	70	72	68	76	81
Barbituric acid	M	0·71	0·93	1·04	1·13	0·80	0·80	1·22	1·28	1·99	3·58	3·94	5·76	4·75	7·44	5·85	7·56
	F	1·35	1·62	1·25	0·65	1·02	1·39	1·61	2·46	3·16	4·29	4·88	6·88	6·50	7·70	8·60	10·01

TABLE III—ACTUAL NUMBERS OF SUICIDES COMPARED WITH THOSE EXPECTED AT THE 1945 LEVEL

Suicidal agent		Males				Females			
		1945	1947	1950	1954	1945	1947	1950	1954
Barbituric acid and derivatives	Actual	20	39	122	161	35	70	156	230
	Expected	..	24	26	28	..	41	39	46
Other analgesic and soporific drugs	Actual	29	58	54	61	47	72	89	82
	Expected	..	35	115	126	..	55	126	148
Other solid and liquid poisons	Actual	121	120	110	82	99	113	83	51
	Expected	..	146	79	87	..	116	35	42
Gases	Actual	744	939	1058	1395	685	858	762	1077
	Expected	..	896	959	1057	..	803	759	892
Hanging and strangulation	Actual	483	582	569	612	130	165	128	128
	Expected	..	581	623	686	..	152	144	169
Drowning	Actual	295	301	330	290	267	234	221	178
	Expected	..	355	380	419	..	313	296	348
Firearms	Actual	184	241	198	197	22	13	9	6
	Expected	..	222	237	261	..	26	24	29
Cutting and piercing instruments	Actual	222	216	198	160	41	44	40	27
	Expected	..	267	286	315	..	48	45	53
Jumping from heights	Actual	52	70	84	76	61	68	51	51
	Expected	..	63	67	74	..	72	68	79
Others	Actual	88	128	162	144	45	43	47	35
	Expected	..	106	113	125	..	53	50	59
Total (actual)	..	2238	2694	2885	3178	1432	1680	1586	1865

means were used have decreased, supports Dr. Geffen's views. Aspirin is another easily obtainable drug, and recently suicide-rates for this agent have increased somewhat, though they are low compared with those for the other two methods: this may be because it is not generally known that a sufficiently large quantity of aspirin is lethal and also because of the large number of tablets which must be swallowed to ensure a fatal dose. The actual and expected deaths (suicides and accidents) due to barbiturate and aspirin poisoning during 1946–54 are shown in table V, the expected deaths having been calculated on the assumption that these forms of poisoning account for the same proportion of the total deaths due to poisoning by solids and liquids as they did during 1939–45 (see fig. 2).

The sex-age suicide-rates from barbiturate poisoning for 1942, 1948, and 1954 are shown in table VI.

The increase in rates is apparent in each age-group shown but is more pronounced at ages 45–64 and 65 and over—i.e., from the age of the climacteric onwards. It is in these age-groups that we should expect to find most of those cases of depression and insomnia for which barbiturates might be prescribed.

TABLE IV—CRUDE SUICIDE-RATES PER MILLION LIVING, ACCORDING TO THE METHOD USED, 1944–54

Suicidal agent	Males						Females					
	1944	1946	1948	1950	1952	1954	1944	1946	1948	1950	1952	1954
Poisoning; analgesics and soporifics	2	3	7	8	11	10	3	5	10	11	13	14
Poisoning; domestic gases	46	46	54	49	52	64	28	36	40	33	34	47
Poisoning, other solids and liquids	7	7	6	5	5	4	5	5	3	4	3	2
Hanging and strangulation	24	32	29	27	25	29	5	8	6	6	5	6
Drowning	19	18	17	16	13	14	11	12	11	10	8	8
Firearms and explosives	12	11	10	9	8	9	*1*	*0*	*1*	*0*	*0*	*0*
Cutting and piercing instruments	15	15	9	9	7	8	2	3	2	2	1	1
Jumping from high places	4	4	5	4	3	4	2	3	3	2	2	2
Other and unspecified means	6	7	7	8	7	7	2	3	3	2	1	2

That barbiturates are dispensed on a fairly large scale is shown from two analyses which have been made of prescriptions on form E.C.10. Dunlop et al.[2] analysed a sample of 11,435 of these forms, comprising 17,301 prescriptions issued during September, 1949, and found 1636 or 9·4% were for barbiturates. In an analysis made by the Ministry of Health[3] of 106,295 prescriptions on form E.C.10 issued during October, 1954, 8·8% were for barbiturates or preparations containing barbiturates. The difference between the percentages may have been influenced by the absence of a predominantly rural area from Dunlop's sample, which covered three types only —prosperous residential, industrial, and mixed suburban —as well as by the disparity in size of the samples; but there have also been material changes in prescribing since 1949, and these may provide a better explanation. The percentages are believed to be calculated on similar bases, but it should be recognised that some of the preparations containing barbiturates contain only small amounts. The percentage of all prescriptions in which barbiturates were the sole or principal therapeutic agent in October, 1954, was 6·4, the balance of 2·4% consisting, among other things, of anticonvulsants, sex hormones, and sedatives and hypnotics other than barbiturates, which would be classed in these groups and not as barbiturates.

As the samples were for September and October, 1954, the proportion of barbiturates to other drugs as between these two months should not be greatly affected by the seasonal variations in drugs prescribed. The selection of

TABLE V—BARBITURATE AND ASPIRIN POISONING

		Barbituric acid						Aspirin					
		Suicides			Accidental deaths			Suicides			Accidental deaths		
		Actual	Expected	A % of E	Actual	Expected	A % of E	Actual	Expected	A % of E	Actual	Expected	A % of E
1946	M	24	17	141	20	17	118	20	15	133	5	7	71
	F	54	29	186	34	23	148	51	32	159	14	8	175
1948	M	73	24	304	34	23	148	56	21	267	16	10	160
	F	96	39	246	41	29	141	101	43	235	16	10	160
1950	M	122	26	469	47	22	214	42	22	191	14	9	156
	F	156	44	355	80	41	195	75	48	156	17	15	113
1952	M	157	32	491	61	30	203	74	28	264	24	13	185
	F	176	48	367	79	41	193	106	52	204	26	15	173
1954	M	161	28	575	67	29	231	49	24	204	18	12	150
	F	230	49	469	117	48	244	64	53	121	14	17	82

September and October as sampling months may, however, have resulted in an unduly high proportion of barbiturates; and had February and March, for example, been selected, no doubt the proportions would have been much less. From estimates made by the Ministry of Health, based on samples in different months, the amount of barbiturates prescribed annually during the last few years may have varied between 80,000 and 100,000 lb., but these estimates should be treated with considerable reserve owing to the large sampling errors involved and the difficulty of knowing how far any particular month's prescriptions may be regarded as representative of dispensing during the year.

Not all cases of barbiturate poisoning are fatal, and the non-fatal ones may require inpatient hospital treatment, or, if less severe and not requiring overnight care, may be dealt with in the outpatients department. In hospital cases it is usually difficult for the statistician to ask for a distinction to be made on a large scale between cases of

2. Dunlop, D. M., Henderson, T. L., Inch, R. S. *Brit. med. J.* 1952, i, 292.
3. Ministry of Health. Personal communication.

TABLE VI—SUICIDE-RATES PER MILLION LIVING, FROM BARBITURATE POISONING BY SEX AND AGE, 1942, 1948, AND 1954

Age-group	1942		1948		1954	
	Males	Females	Males	Females	Males	Females
15– ..	1·7	0·5	3·2	3·3	6·3	5·4
45– ..	1·6	1·5	7·3	8·6	14·9	18·1
65 and over	0·6	0·4	5·1	6·3	12·8	24·4

attempted suicide and of accidental poisoning, although this may occasionally be done in individual hospitals by someone on the spot. Thus Locket and Angus,[4] reviewing 64 consecutive cases entering Oldchurch Hospital in the four preceding years, found that 49 at least were suicidal attempts. Moreover, of all cases of attempted suicide admitted alive during the four years, barbiturates were the chosen agents in more than 80%. "In all but 2 of the 64 cases, the barbiturate was prescribed for the patient by his medical practitioner, and in more than 90% it was given for insomnia, either alone or as the major complaint."

From statistics of samples of hospital patients made by the General Register Office, some idea may be gained of the number of patients treated for barbiturate poisoning. Without going at length into methods of sampling, relative proportions of teaching and non-teaching hospitals covered by the inquiry, and similar matters, it can be said that, on a rough estimate, the number of such patients in England and Wales was :

1949, 2800 1951, 3950 1953, 4200

In addition, therefore, to the increase in the suicide and accidental death-rates from barbiturate poisoning, it can safely be said that the number of cases requiring hospital treatment has also increased in recent years. The case-fatality rate of patients admitted in 1949 and 1951 was of the order of 4–6% for males ; for females it was about 11% in 1949 and 5% in 1951, the lower rate in the latter year being largely due to the fact that of 63 women aged 25–44 in the teaching-hospital sample, and 21 aged 45–54 in the sample from hospitals under regional boards, none died.

Since in this country barbiturates are obtainable only on prescription, there is not likely to be any great demand for admission of addicts to mental hospitals similar to that described by Curran.[5] Nevertheless there is said to be considerable support for the view that repeated doses of barbiturates can cause addiction in the sense of giving rise to an abstinence syndrome.[6] Weiss [7] has described the nervous manifestations which characterise chronic barbiturate intoxication and which may reach the stage of simulating epidemic encephalitis, pseudobulbar palsy, acute psychic depression, delirium tremens, and cerebral vascular thrombosis. There is also the recognised danger of death due to the lowering of the lethal level of barbiturates if combined with a high blood-alcohol level.

Interviews with a psychiatrist showed that, of Locket's series referred to above, not only had 49 attempted suicide, but 9 of the 64 patients had made one or more previous attempts. Severe depressive states were diagnosed in 19 patients and 12 others had "severe social and domestic disturbances." At least 13 of the series had previously been in mental hospitals. If these cases may be regarded as typical of people admitted to hospital with barbituric acid poisoning, the presence of these drugs in quantity in households where there are sufferers from depression, persons with overwhelming problems, or those who have previously made suicidal attempts, might be regarded as an invitation to seek a painless evasion of their difficulties. The danger from patients being given liberal supplies of barbiturates was mentioned in THE LANCET [8] in reporting that of two male suicides investigated by the Manchester city coroner on the same day, one had been given a fortnight's supply of the drug and the other had received 72 tablets ten days before his death, of which only 4 remained. The continued increase in suicides, accidental deaths, and hospital admissions from poisoning by barbiturates suggests that the time is ripe to ask once again "Too much barbiturate"?

4. Locket, S., Angus, J. *Lancet*, 1952, i, 580.
5. Curran, F. *J. nerv. ment. Dis.* 1944, **100**, 142.

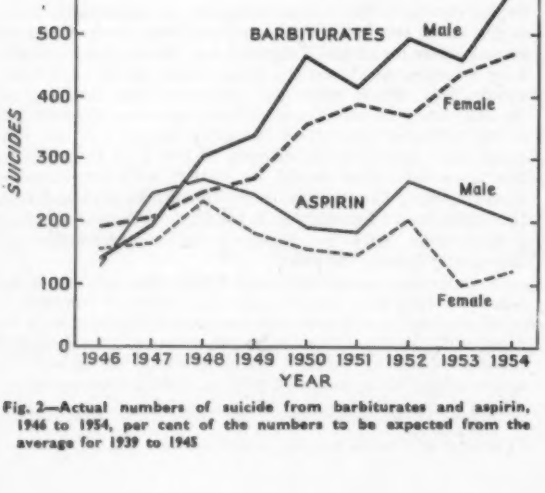

Fig. 2—Actual numbers of suicide from barbiturates and aspirin, 1946 to 1954, per cent of the numbers to be expected from the average for 1939 to 1945

OPPORTUNITIES IN AUSTRALIA

FROM A RETURNED CORRESPONDENT

SINCE Professor Hare wrote about the incomes of general practitioners in Australia [9] there has been much argument as to whether, when he talked about £A12,000 incomes for young practitioners, he was anywhere near the mark. Having inquired fairly carefully, I believe that he painted too rosy a picture, just as Sir Stanley Davidson,[10] who said that the Dominions were too full of their own under-employed doctors to offer careers for men from Britain, painted one that was far too gloomy.

Australia is a large country, and, though its population remains small, anyone who wants to consider the prospects of a doctor there should recognise three quite different kinds of environment.

Firstly, there are the large metropolitan cities—the capitals of the six States—which between them contain more than 60% of all the people. They are the commercial, administrative, and cultural centres of their respective States, and round them the secondary industries began. Geographically they are exceptionally well sited, and they have better amenities for sports, for entertainment, and for schooling, than are found anywhere else in Australia. They are all growing ; houses and flats are at a premium, and new suburbs are spreading out into the countryside. In more than one of these cities the past ten years has seen an increase in population by more than a third.

Next there are the large country towns and cities. Formerly the marketing and trading centres for the countryside, or the site of mines or ports, many are now developing their own secondary industries, and where this is happening they too show signs of rapid growth.

Finally, there is the countryside proper, where the wool, the wheat, the meat, the fruit, the sugar, and the timber, on which Australia's prosperity rests, are grown. Here by

6. Annotation. *Lancet*, 1952, i, 406.
7. Weiss, S. *J. Amer. Med. Ass.* 1936, **107**, 2104.
8. See *Lancet*, 1952, i, 879.
9. Hare, R. *Lancet*, 1955, ii, 614.
10. Davidson, L. S. P. *Brit. med. J.* 1955, i, 1171.

British standards the towns are small, distances are great, and the doctors work in relative isolation.

In all three types of area extra general practitioners are needed. In the country because there never have been enough to give an ideal service (and also because there is a tendency for doctors to serve a term in the country and then migrate to the cities); in the large towns, and in the metropolitan cities, because of the steady growth of population. In all areas, a locum tenens is difficult to find. In the growing towns and cities a properly trained youngster should not find it hard to establish himself and achieve a satisfactory income within two or three years. That income is not very likely to be £A12,000, but it could be that, if the newcomer was energetic, was a good general surgeon, and settled in an area where he had access to sufficient hospital beds to enable him to combine regular major surgical, gynæcological, and obstetrical work with his general practice. It is more likely in most places that his gross earnings would be around £A8000 (in purchasing-power equivalent to about £6000 sterling) and that his practice expenses would approach a third of this. The acquisition of a practice and its equipment should not be a matter of great expense, except that both houses and cars are appreciably more expensive in Australia than in Britain.

There is no resistance to the entrance of British doctors; no extra examinations have to be passed; the individual practitioners and the British Medical Association in Australia say that colleagues from Britain will be welcome. Although the medical schools in Australia are full, the number of graduates each year does not provide enough general practitioners to meet the needs of the growing population.

For consultants, the opportunities are very much less. The number required is relatively small, and many Australian graduates are willing to spend postgraduate years in Australia—and often also in Britain or America—training themselves for consultant and specialist posts that may fall vacant in specialist-staffed hospitals. These hospitals, situated almost exclusively in the cities, usually prefer to appoint their own Australian graduates to their specialist posts, rather than look overseas. The exception to this rule seems to be in the academic field. Increasingly in the past few years the university medical schools have been establishing professorial units (with full-time—or something equivalent to our maximum part-time—contracts) to work in concert with the honorary clinical staff. Not a few of these clinical teaching posts have gone to candidates from Britain.

A notable academic venture now taking shape is that of the University of Western Australia, which has hitherto had no medical school. Thanks, firstly, to a promise of State aid, but also to a remarkably successful appeal to the public for funds (in a little over two months £400,000 was voluntarily given in a State whose total population is little more than 650,000), the university is now in a position to develop its own school of medicine, and among the first steps it has taken has been to advertise eight new chairs—four in preclinical and four in clinical subjects.

New buildings (and well-planned adaptations of existing ones) look like providing first-class conditions for teaching and for research. The newly built Royal Perth Hospital, with over 600 beds, will be the major teaching hospital, though obstetrics and gynæcology and pædiatrics will be taught at two other hospitals in Perth. The Fremantle Hospital will provide additional general inpatient and outpatient teaching, while a new chest hospital now building in Perth will be used for teaching on tuberculosis and thoracic diseases—the total of beds available for teaching being more than 1400.

There is a wonderful opportunity here for constructive and original work by a team of young teachers, able to use their own ideas to build a new tradition in a new university, and I hope that Britain will be well represented among the men chosen for these new chairs.

Public Health

HEAT-TREATMENT OF IMPORTED CHINESE EGG-ALBUMEN

A PRELIMINARY REPORT

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SINCE the demonstration in 1955 that imported Chinese egg often contains salmonella organisms, and very occasionally *Salmonella paratyphi-B* (Newell et al. 1955), justifiable doubts have been expressed about its safety. Large quantities of Chinese egg-albumen are imported annually (7000 cwt. in 1954) and these are used extensively in the bakery and confectionery trades, as well as in the manufacture of envelopes and adhesives, and in bookbinding.

Chinese egg-albumen is imported in crystalline form, in which the crystals are roughly the size of those in coffee sugar. Because of this, it has not been possible to devise a satisfactory bacteriological control of this product on arrival in this country. Even when careful samples have been taken from all parts of the containers (usually it is imported in 100-lb. wooden cases), a negative finding can never exclude live salmonellæ trapped in the remaining crystals.

That egg-albumen imported and processed in Liverpool was infected was first demonstrated in July, 1955. Since that date, 1625 samples have been examined from the cargoes of 7 ships importing Chinese egg-albumen. 226 (13·6%) of these samples were found to be infected with *S. thompson*. There has been considerable variation between the degree of salmonella contamination in different cargoes; and in one shipment it was as high as 47·1%. No *S. paratyphi-B* have been isolated in the Liverpool series.

The degree of infection of this material emphasised that it was most important to discover if possible a practical method of heat-treating the albumen to make it safe. Consequently, experiments were begun in coöperation with a local firm which dealt in large quantities.

This preliminary report of the work is now being published as a practical method of pasteurisation has been evolved, and it seems desirable that details should be made available so that other workers may check and perhaps improve on our method.

THE PROBLEM

The main difficulty was that heat-treatment tended to change the quality of the product and make it useless commercially. Heat coagulates the albumen, and this rapidly leads to a reduction of solubility.

It is of interest to note that the Chinese sun-dried product is more highly prized by the bakery trade, because its qualities are said to be superior to the more hygienically machine-crystallised albumen. The more primitive Chinese method of crystallising the albumen produces a better commercial product, but one which is much less pure bacteriologically.

THE EXPERIMENTS

A series of experiments was undertaken to test the effect of various methods of heat-treatment on the

product. Attempts were made to infect some egg-albumen artificially with salmonella organisms. To produce comparable conditions, it was important to contaminate the centre of the crystals, and to do this, albumen had to be dissolved, infected, and re-crystallised. Unfortunately, the resultant crystal formation was so different from the original albumen crystals that this method was abandoned. All experiments were thereupon carried out on imported crystals known to be heavily infected with *S. thompson*.

The experiments can roughly be divided into six different stages. Full details are not given here, but will appear when the full report is published.

Certain of the egg-albumen crystals were powdered by crushing, and comparisons made between the effect of heat-treatment on this powdered material.

First Stage

Initially, experiments were designed to find the effect of a wide range of temperature and time. A total of 52 samples of both crystalline and powdered egg-albumen known to be heavily infected with *S. thompson* was tested.

Results varied considerably, and some samples withstood temperatures of 165°F for 10 hours, and 190°F for 3 hours, without the salmonella organisms being completely killed. It was noticed that the relatively low temperature of 130°F for 3 days produced negative bacteriological results. At first, the significance of this was not fully realised.

Second Stage

Tests were continued to examine the effect of high temperatures of 180°F and 200°F for $^1/_2$–5 hours. Initially, the results seemed promising, for periods of heat-treatment of 180°F for $1^1/_2$–2 hours and of $^1/_2$-hour at 200°F gave repeated negative results for both crystals and powdered samples.

This experiment emphasised that powdered material was much more easily heat-treated than the crystalline products. The significance of this finding increased as the investigations proceeded.

Up to this point, all experiments had been carried out in an experimental oven, but difficulties appeared when attempts were made to treat large quantities. A heat-processing machine, capable of dealing with 200–300 lb. of material at a time, was used. Heat was provided by hot air, but it was found impossible to maintain in all parts of the chamber an even temperature of 180°F for 3–5 hours. There were areas at which the temperature never exceeded 110°F, while at the heat inlet a charring of albumen occurred. Quite apart from this difficulty, it was estimated that this process was too costly.

Third Stage

The effect of long-continued low temperature was next investigated.

Initial experiments showed that heat treatment at 120°F was uncertain, for salmonella organisms persisted after 4 days in approximately 1 out of every 5 samples tested. By raising the temperature to 130°F, however, all salmonella organisms were killed after four days' treatment.

RESULTS OF HEAT-TREATMENT OF INFECTED CHINESE EGG-ALBUMEN UNDER VARIOUS CONDITIONS AT 130°F

Samples heated at 130°F					Unheated control samples		
Samples in centre of	No. of samples	Time (days)	Result		No. of controls	Result	
			Positive	Negative		Positive	Negative
(*a*) 1-cwt. bag	5	1	5	0	5	5	0
	5	2	0	5	5	5	0
	5	3	0	5	5	5	0
	5	4	0	5	5	5	0
	5	5	0	5	5	5	0
(*b*) 100-lb. case	5	1	5	0	5	5	0
	5	2	3	2	5	5	0
	5	3	0	5	5	5	0
	5	4	0	5	5	5	0
	5	5	0	5	5	5	0
(*c*) 28-lb. tin	5	1	4	1	5	5	0
	5	2	0	5	5	5	0
	5	3	0	5	5	5	0
	5	4	0	5	5	5	0
	5	5	0	5	5	5	0

All positive samples yielded *S. thompson*.

Fourth Stage

The next experiment was designed to test this method (130°F for 1–5 days) in conditions similar to those likely to be experienced commercially. Samples of crystalline albumen known to be very heavily infected with *S. thompson* were wrapped in 'Cellophane' packets.

For each test, for every cellophane packet of egg-albumen which was heat-treated, another sample was set aside for bacteriological examination as a control.

The samples to be tested were placed in the centre of: (*a*) 1-cwt. bag of albumen crystals; (*b*) 100-lb. wooden case of albumen crystals; (*c*) 28-lb. tin of albumen crystals. The results are given in the accompanying table.

These results were then checked, using ten samples at each temperature with similar results: no organisms survived after 4 days at 130°F with crystalline material, or after 2 days at 130°F with powdered albumen.

These large-scale experiments and all subsequent ones were carried out in a hot room measuring 14 × 12 × 9 ft. As it was a converted refrigeration room, heat insulation was very good, and it was heated during these experiments by three radiant electric heaters. An electric fan ensured complete circulation of air. The temperature was thermostatically controlled, and a Cambridge temperature recorder was installed outside (see figure).

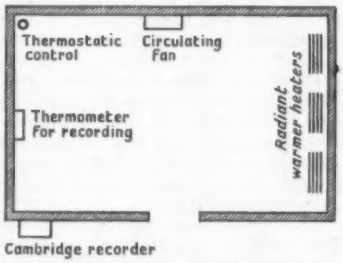

Diagram of the hot room.

Fifth Stage

This experiment was designed to test the effect of placing 100-lb. wooden containers at various parts of the hot room. It was found that each container had to be placed at least 2 ft. from the floor, otherwise the hot air circulating did not heat the centre sufficiently. When raised 2 ft. from the floor, and provided a free air space separated different containers, a temperature of 130°F was reached in the centre of the container within 36 hours, with an air-temperature of 140°F (provided the fan was used).

Thus, with 100-lb. containers, 36 hours must be added to the time of the earlier experiments.

The cost of heating the room with the three electric heaters was roughly 4*s.* a day.

Sixth Stage

The final test was to measure the effect of heat-treatment on solubility.

It was found that with the crystalline product 4 days at 130°F was satisfactory, but after 5 days at 130°F, changes reducing the solubility were demonstrated. Heat-treatment on the powdered material showed less effect on solubility.

DISCUSSION

These results suggest that the final solution of the problem of infected egg-albumen will probably be mass low-temperature heat-treatment.

To make treatment easier, all material should first be powdered. The aim of heat-treatment should be to ensure that a temperature of 130°F is maintained in the albumen in the centre of the container for 4–5 days. It is estimated that in a hot room devised for this purpose, it would be necessary to have an air-temperature of 140°F for $5^1/_2$–$6^1/_2$ days after the albumen is first placed in the room. It is most important to maintain free circulation of the heated air, and to stand the cases at least 2 ft. off the ground.

Further experiments are being carried out to ascertain whether the $5^1/_2$-day method has a sufficient safety margin. It will be a great advantage to reduce the time as far as possible, so that the effect on solubility will be slight.

Because of the dangers of machines becoming infected during the process of powdering, it is suggested that it should be obligatory on all exporters in China and elsewhere, to powder the product before shipment. The 100-lb. cases could then be dealt with by this method of heat-treatment without any danger. The control of this heat-treatment could best be supervised by the medical officer of health at the port of importation in the same way as pasteurised milk is supervised.

The bakery and confectionery trades want Chinese crystalline egg-albumen as an ingredient, and it is doubtful whether at present we can depend on this product being handled in such a way in China as to ensure its freedom from harmful pathogenic organisms. Therefore, as with milk, we must fall back on some form of pasteurisation to ensure that such pathogens are not consumed by the British public.

SUMMARY

Six months' experimental work into the heat-treatment of imported egg-albumen has suggested a practical, cheap, and effective method of heat-treating bulk supplies of egg-albumen crystals at 130°F for $5^1/_2$–$6^1/_2$ days.

It is recommended that steps be taken to make it obligatory for all imports of egg-albumen from China to be powdered and heat-treated on arrival in this country.

We are grateful to Messrs. Goldrei Foucard, Aintree, Liverpool, for their coöperation and generous supplying of material for experiments, and for the experimental facilities provided at their factory. Our sincere thanks are also due to Prof. D. T. Robinson and Dr. E. C. Armstrong, of the Public Health Laboratory Service, Liverpool, for performing the extensive bacteriological sampling.

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Newell, K. W., Hobbs, B. C., Gordon-Wallace, E. J. (1955) *Brit. med. J.* ii, 1296.

Influenza

On Jan. 17 influenza-A virus was identified from 2 cases in the Ipswich area. New claims for sickness benefit in the week ended Jan. 10 were much above average at the Ipswich, Stowmarket, Felixstowe, and Woodbridge offices of the Ministry of Pensions and National Insurance. There is a lot of influenza-like illness in East Suffolk and virus A may well be responsible.

Epidemic Respiratory Illness in Children

As we reported last week, there has been an outbreak of acute respiratory illness among children in Liverpool. The total number of cases traced up to Jan. 16 was about 300, although many patients treated at home have probably not been included. Last week 61 patients were admitted to Liverpool hospitals with a diagnosis of bronchopneumonia. A second child died last week and post-mortem specimens have been sent to the M.R.C. Virus Reference Laboratory. It is difficult to know whether the peak of the epidemic has passed, but there are many indications that it has. Health-visitors are at present seeking information about the health of family contacts.

In the past fortnight there was a definite increase in the amount of illness generally in Liverpool; and in the week ending Jan. 10, 5700 new claims for sickness benefit were received for the Liverpool area. It is rare for the weekly figure to exceed 5000. Figures for all deaths in the past two weeks are as follows:

	Week ending *Jan. 14*	*Jan. 7*
Total deaths	211	222
Deaths due to respiratory diseases:		
At all ages	50	56
Under 2 years	5	7

In England Now

A Running Commentary by Peripatetic Correspondents

The New Gentlewoman's Toilet Guide was in the sixpenny secondhand tray. Although it may not have the intrinsic value of the Ebers papyrus, it is much more legible and is equally a mirror of the medical and cosmetic practice of its age. The illustrations and a fleeting reference to Garrison Hair Dye suggest the end of the first world war, the text a pre-Coward nostalgic effort to recapture the spirit of Cavalcade. I do not claim to keep abreast of current neckline adjectives, but observation without palpation would describe the models to be sagging rather than plunging. The Mesopotamian campaign seems to have influenced the nomenclature of toilet preparations. Fatima Balsam from a clean saucer was just the thing for an emancipated generation of free-limbed and graceful girls. Pummelling it into the bosom for ten minutes every night increased the bust to operatic dimensions. If joy through strength was overzealous a slap or two with Zorida Lotion would secure retraction within the limits of the corsage. Such an Alice-in-Wonderland touch would be handy nowadays to enhance woolly sweaters in the daytime and minimise the catastrophic insecurity of modern evening dress. But whether Madame was coming up or the gown was slipping down appeared to be of no great moment when Mimi Creme achieved the lustre of a snowy-breasted pearl, and Taj Mahal Emulsion had whipped the acne pimples off her back. Venus de Milo's marble must have looked adolescent by comparison.

The pink and white complexion of an Edwardian intact world could be restored with a couple of bottles of Lait Virginal, made from an old prescription described rather cynically as favoured by the beautiful women at the court of Charles II. Whatever disillusionment the war had brought, the situation could be retrieved with a pot of Maiden's Blush. "Please send me two dozen" runs one testimonial, but a discreet veil is drawn over the cause for her blushes. Do maidens blush today? It's so long since I tried to make one that the section on salts for suppressed gout looks more my line. It conjures up mental pictures of the North West Frontier and my paternal grandfather. A bookmarker keeps the place for alternate generations, and my big toe tingles expectantly.

Even with para-professional privilege and the odd thankoffering of gin at New Year I cannot get a dental appointment for my fillings under a couple of months. In the good old days of *The Gentlewoman's Guide* a highly recommended Tooth Stopping Cement kept the family masticating and free from halitosis. I suppose it was pushed in with a hat-pin. The chapter on self-massage looked promising. I tried upward traction on my wrinkled forehead, kneading my double chin according to directions, firmly but not violently, smoothing out the bags below my eyes. The snag was that without a bottle of Shalimar Enamel the whole dissipated lot flopped back like the flews of a bloodhound. I am off to the bookshop in search of *The New Gentleman's Guide*.

* * *

The somatic physician who goes digging in the psychiatrists' garden is in for a bewildering experience. It is like groping one's way in a darkroom with both feet off the floor; and as one's eyes become accommodated to delicate shades of grey, one surprise follows another.

Ward rounds are particluarly strange. Instead of moving from bed to bed inquiring: "How are you," I now pass from chair to chair asking for the name of the Prime Minister. One patient gave me a cheery "Good morning!", but when I told the psychiatrist, he said: "I know, poor soul, she is very disturbed." Several mornings are spent in the production of convulsions and coma, and I find it difficult to keep my thoughts from the many sleepless nights I had doing the opposite. Apparently the TV is the biggest boon to psychiatrists since electricity was invented; all programmes from the interludes to "Puzzle Corner" are followed with rapt attention. *Punch* is heavily subscribed to, and even in the doctors' mess a pile of copies holds pride of place next to *The Lancet*.

Relatives have to be interviewed the whole time, not so much with the idea of imparting information as to ascertain the aberration in themselves which precipitated the patient's trouble. However, I had to sympathise with the husband who told me how it all began with his daughter's blinking eyes. The school nurse said it was a cold, the doctor conjunctivitis, and the optician short sight. They went to a specialist in Harpole Street who said it was astigmatism and ordered reading glasses, but another specialist in Wimley Street ordered distance glasses, while a third specialist at the hospital said that no glasses were needed at all. "The wife has been confused ever since," he explained.

* * *

As a devotee of this column, I may be excused for taking a special interest in Berwick-upon-Tweed, which might suitably have chosen "In England Now" for its motto—at least since the Reform Act of 1885. Before then the citizens must have had great difficulty in knowing when they were and when they were not in England. The town changed hands between England and Scotland thirteen times from 1147 to 1482: it then became semi-independent, so that it had to be specially mentioned in all Acts of Parliament. Berwick was included in the declaration of war on Russia before the Crimea, but this was forgotten when peace was made. It will be interesting to see whether Mr. Krushchev travels the Great North Road when he pays his promised visit to this country.

Berwick is an anomalous place altogether. It has its being in Northumberland but gives its name to a Scottish county. Its Royal Border Bridge crosses the Tweed but not the border. It is Scottish in speech and in appearance. Its football team, Berwick Rangers, play in the Scottish League. There has long been a movement for a return to Scotland, but it seems unlikely that this will be achieved. For one thing, the difficulty of redrafting all the statutes suggests that Berwick will continue to provide a typical example of British compromise. Cynical Scots may take pleasure in pointing out that it is no compromise to leave Berwick a few miles on the English side of the Border, but it has its uses. The Scotsman who is wise enough to take the East Coast road to England is offered a gradual introduction to his new environment. Strengthened by the sight, as he passes through Berwick, of Scotsmen everywhere, the peripatetic Scots graduate will be helped to withstand the shock, as he journeys further South, of meeting an occasional English doctor.

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At first sight the Mitsukoshi looks like any other chain store. The lower floors are full of American-style goods; but when you climb to the fifth you find good lacquer, damascene, cloisonné, pottery, and prints. I spent an interesting hour watching the Japanese shoppers. Some of the men were dressed in ready-made American-type lounge suits, some in the Oriental fashion, and some in a mixture of the two—an American overcoat and plug hat surmounting the dignified and well-tailored Japanese garments, with slippers or clogs on the feet. Japanese women wearing kimonos carry their babies in a kind of sling upon their backs. The babies are curiously submissive, too good to be true, and when they fall asleep their heads loll alarmingly as though about to fall off, though I never actually saw this happen.

Japan is still a man-run country. Father strides ahead of mother who carries not only the baby but most of the parcels. When father grows tired he sits on some convenient seat; but mother remains standing respectfully beside him, and in the restaurant he is served first.

* * *

I speak of bulimic obesity,
Of energy output and calories;
Of whether or not a disease pretty
Closely related to salaries,
Greed, and the middle-aged spread
Deserves differential prognosis
From that of the vast overfed
Example of grave neurosis.
In psychosomatic tomes
I search in vain for prediction.
Which of today's gastronomes
Are tomorrow's victims of eating addiction[1]?

Letters to the Editor

POLIOMYELITIS: A BAFFLED LAYMAN

SIR,—As a layman I have recently had to decide whether or not to keep my child away from school after a classmate had contracted poliomyelitis. I learned [1] that paralytic poliomyelitis has a 40% death or disablement rate, that the death-rate is highest in the younger age-groups, that the disease is probably transmitted by personal contact in a narrow stream of the population, that there are many unrecognised cases which can pass on the infection, and that the chain of infection was followed through for 31 out of 37 cases in the Isle of Wight epidemic of 1950. I therefore decided to keep my child at home for at least three weeks, arguing that, while she might develop the disease as a result of the exposure to infection which she had already experienced, she would at least not be exposed to possible infection from any further cases (recognised or unrecognised) which might develop.

I am, however, very puzzled about the different attitudes of the various authorities both in my district and over the country as a whole.

The school doctor here says: "keep the children away from crowded places (e.g., cinema, parties)," but apparently does not go on to make what seems to me the logical extension by saying that they should be kept away from the crowd in which the virus is known to be circulating (i.e., school).

At a nursery-school in my district mothers were informed when the older sister of one of the little ones had poliomyelitis and told to keep their children at home if they wished. However, I was not notified by my daughter's infant school of the case in her class, and in fact subsequently discovered that there had been a previous case in the school two weeks before. In spite of this the headmistress said it is "perfectly absurd" to keep the children away from school. Yet in some other parts of the country, when a case of poliomyelitis occurs schools are closed or the parents told to keep their children at home if they wish.

In my area not only does the public-health department consider it unnecessary to keep children away from school, but a health visitor is reported as having told the mother of a child with poliomyelitis not to tell people what was the matter. I cannot believe that a policy of secrecy is right unless there is absolutely no knowledge of how the disease is transmitted, and, if my understanding of the medical literature is correct, the position is by no means so black as that.

In this district the fathers of both the cases of which we know continued going to work; but when one of my office colleagues contracted the disease the friend with whom he shared a flat was kept from work for three weeks, while my office in London was notified of the case by the local medical officer.

Should there not be a consistent policy over the whole country? If medical opinion is too divided for this to be possible, could not the public be told the known facts and left to make their own individual decisions as to what precautions they take?

R. H. DAW.

BREAD

THE WIDDOWSON-MCCANCE INVESTIGATION

SIR,—In your leading article of July 30 last you said that nothing in the Sanderson-Wells lecture [2] or in the Widdowson-McCance report [3] had altered your preference for high-extraction or National flour as opposed to enriched white flour; and, in support of your conclusion, you quoted figures suggesting that the 70% white flour used in the investigation was in fact not a 70% flour at all, but one approximating to an 80% National flour. In your issue of Sept. 3 I pointed out that this suggestion was incorrect, and therefore misleading. The detailed evidence which you then gave in a rejoinder to my letter

1. E.g., Agerholm, M. *Lancet*, 1953, ii, 287, and subsequent correspondence.
2. McCance, R. A., Widdowson, E. M. *Lancet*, 1955, ii, 205.
3. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 287, 1954.

showed a confusion of thought to which I was tempted to reply; but at the time it seemed more appropriate to prepare a report on the matter for the Cohen Committee, and this was done. However, I now find that at least one other medical journal has apparently accepted your objection as correct. As it would be regrettable if the scientific implications of the Widdowson-McCance investigation, unique of its kind, were restricted by any ill-founded criticism, I feel that a further reply is imperative.

Before discussing the actual composition of the flours, I should mention that they were not milled under ideal circumstances.

At that time (1947–48) the extraction of National flour was 85%, and in the ordinary way the clothing of the sifters in the mills would have been changed for the milling of 70% flour. This was impossible; but the milling was carried out under the supervision of experienced staff of the Cereals Research Station, and in the case of the 70% flour several runs were made and the flours analysed before the final flour was regarded as satisfactory. The difficulty—as mentioned in the Widdowson-McCance report—was to prevent too much powdered scutellum and bran from getting into the flour; this possibility was due to the relatively wide mesh of the silks covering the several flour sieves.

Three consignments of flour were supplied: (1) a quantity of 70% for the preliminary period only (i.e., before the experiment proper began); (2) the first main consignment; and (3) the second main consignment. The two main consignments were carefully sampled and analysed at the Cereals Research Station before dispatch, and the results are contained in two letters to Professor McCance, then in Germany, dated May 20, 1947, and Jan. 2, 1948. The figures for the 70% (unenriched), 85%, and 100% flours were:

Flour extraction	Vitamin B_1 (µg. per g.)	Nicotinic acid (µg. per g.)	Iron (mg. per 100 g.)	Protein (%)
First consignment				
70%	1·2	10	0·99	10·9
85%	3·2	26	2·26	11·8
100%	3·9	48	3·65	11·95
Second consignment				
70%	1·2	..	1·1	..
85%	3·3	30	1·8	..
100%	4·2	50	3·6	..

When we later analysed for vitamin B_1 a sample of 70% flour from the first consignment that was sent to us from Germany the figure obtained was 1·1 µg. per g. (report, p. 98). The average analysis of the 70%-extraction flour as determined at the Cereals Research Station may therefore be taken as:

Vitamin B_1	1·15 µg. per g.
Nicotinic acid	10 µg. per g.
Iron	1·05 mg. per 100 g.

It was on these figures that the degree of enrichment of the other flours used in the investigation was calculated.

For a 70–72%-extraction flour the Ministry of Food's *Manual of Nutrition* (1945) gives the following figures:

Vitamin B_1	0·7 µg. per g.
Nicotinic acid	11 µg. per g.
Iron	1·4 mg. per 100 g.

In February, 1953, the Ministry adopted the following revised figures:

Vitamin B_1	0·8 µg. per g.
Nicotinic acid	8 µg. per g.
Iron	1·25 mg. per 100 g.

All the vitamin-B_1 figures so far mentioned, including those adopted by the Ministry of Food, were obtained by the method in use at the Cereals Research Station since the outbreak of the war.[4] The nicotinic acid was assayed by the microbiological method also developed at the station, and in experiments carried out in the last few months, on a wheat mixture similar to that used in the Widdowson-McCance investigation, two flours of 70% extraction milled in different ways gave nicotinic-acid figures of 11·3 and 11·4 µg. per g., whilst a 65%-extraction flour gave the figure of 10·2 µg.

The conclusion is that the nicotinic acid and iron contents of the 70% flour used in the German investigation were normal for a 70% flour: the B_1 content is slightly high but still within the range for a 70% flour. Thus, in one of the important papers by Dame Harriette Chick and her colleagues [5] showing the effects of flours of different extraction-rate on the growth of rats the 70% flour had a B_1 content of 1·09 µg. per g. (the value was determined at the Cereals Research Station). Kent-Jones [6] also gives 1·1 µg. per g. as the average figure for a white flour of about 72% extraction.

Your leading article quoted some of the published data on the composition of flour without apparently appreciating how most of these data were obtained. The composition of 80% National flour, for example, was laid down by the Conference on the Post-War Loaf. This definition which forms the basis of the Flour Order, 1953, gave the following *minimum* figures for the three nutrients:

Vitamin B_1	2·4 µg. per g.
Nicotinic acid	16 µg. per g.
Iron	1·65 mg. per 100 g.

It is of course easy to mill an 80%-extraction flour which would have lower levels of these three nutrients; but such a flour would not conform to the prescribed standards for National flour (which in fact is relatively difficult to mill). For this reason the 80% flour quoted by you, which was obtained in a laboratory investigation [7] in which no attempt was made to mill the flour to the Post-War Loaf standards, cannot properly be used as a standard of comparison.

Furthermore, one cannot compare data obtained by different methods unless these methods have been shown to give reproducible and identical results on the same sample of material (flour). Thus, the figures for B_1 and nicotinic acid quoted by Dr. Holman in the report were obtained by entirely different methods, the first using adsorption on Decalso with an internal standard and which is held to give higher values than the conventional thiochrome method for flour used at St. Albans,[8] whilst the nicotinic-acid figures were obtained by a chemical method in contrast to the microbiological method used for the figures obtained originally on the two consignments of flour.

The protein figure of a flour from a given wheat is also an index of its extraction-rate. It is our experience that on the average the difference in protein content between a 70% flour and the whole wheat is about 1%, and between 80% and the whole wheat about 0·5%. Below, therefore, are listed the characteristics of the 70% flour used in the Widdowson-McCance investigation, with those which would have been expected for an 80% National flour from the same wheat mixture. The methods of assay are of course the same for both flours.

—	70% flour (as found)	Corresponding National 80% flour
Vitamin B_1	1·15 µg. per g.	2·4 µg. per g.
Nicotinic acid	10 µg. per g.	16 µg. per g.
Iron	1·05 mg. per 100 g.	1·65 mg. per 100 g.
Protein	10·9%	11·5%

From these figures it is certainly difficult to see any justification for your statement of June 30 that the 70% flour was comparable to National 80%-extraction flour.

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T. MORAN.

4. Ridyard, H. N. *J. Soc. publ. Analysts*, 1949, **74**, 18.
5. Chick, H., Copping, A. M., Slack, E. B. *Lancet*, 1946, i, 196.
6. Kent-Jones, D. W. *J. roy. Soc. Arts*, Jan. 13, 1950.
7. McCance, R. A., Widdowson, E. M., Moran, T., Pringle, W. J. S., Macrae, T. F. *Biochem. J.* 1945, **39**, 213.
8. Ridyard, H. N. *J. Soc. publ. Analysts*, 1950, **75**, 634.

SIR,—As the B-vitamin section of the Widdowson-McCance investigations was carried out and reported by me,[1] and as my interpretation of the analytical values for the 70%-extraction flour differs in some important respects from that suggested in your leading article of July 30, it seems desirable that my own views should also be made known.

Your article takes no account of the fact that the chemical method I used for nicotinic acid gave considerably higher values for the 70%-extraction flour (though not for the flours of higher extraction) than did the microbiological method employed at the Cereals Research Station. When reporting the results of the investigations [1] I gave the microbiological as well as my own values (see p. 97), but pointed out (p. 108) that the German children's nicotinic acid intakes appeared to be adequate whichever value was used in the calculations.

Comparisons of nicotinic acid content should be based on results obtained by the same analytical method. Since the values for laboratory-milled flours [2] to which you refer were obtained at the Cereals Research Station, it follows that this Station's value for the experimental 70% flour should be taken to compare with them. When this is done there is nothing to suggest that the 70% flour used in Germany was considerably richer than other flours of this type. Moreover, a comparison between the Cereals Research Station's value of 10 μg. per g. for the 70% flour used in Germany and their value of 16 μg. per g. for National 80% flour [3] (see table 12) indicates that the former was in no way comparable with the latter.

With regard to vitamin B_1, the method I used gave values for the flours which were slightly higher than the corresponding values obtained at the Cereals Research Station by a different method. Both were chemical methods, but, since metabolic studies on the children formed the main subject of the B-vitamin investigations in Germany, mine was a procedure applicable to mixed diets, urine, and fæces. The Cereals Research Station method was a method designed specifically for flour and was not applicable to other types of biological material.

I concluded,[1] from a comparison of my values with data from the general literature (see p. 97), that the 70%-extraction flour used in the experimental periods was within the normal range with respect to vitamin-B_1 content, but was at the upper end of the range. When the Cereals Research Station value of 1·1 μg. per g. for the German 70%-extraction flour (p. 98) is compared with their values of 0·7–0·8 μg. per g. for other flours of this type [2] a similar conclusion is reached. Since the Cereals Research Station values were all obtained by the same method of analysis and since their values for laboratory-milled 80%-extraction flours were 1·8–2·0 μg. per g.,[2] and for National 80%-extraction flour 2·4 μg. per g.,[3] it seems clear that the 70%-extraction flour used in Germany was slightly richer than average, but was in no way comparable with an 80%-extraction flour as regards vitamin-B_1 content.

The riboflavine in the 70%-extraction flour used in Germany was not discussed in your leading article, and as an index of the B-vitamin status of flours is admittedly less useful than the concentrations of vitamin B_1 and nicotinic acid, because the difference in riboflavine content between flours of 70 and 80% extraction is relatively small. It is of interest, however, to note that there was good agreement, on the whole, between my values for the experimental flours obtained by a chemical method and the corresponding values obtained microbiologically at the Cereals Research Station, and that the Cereals Research Station value of 0·47 μg. per g. for the 70%-extraction flour was not only lower than the values of 0·8 μg. per g.[2] and 0·7 μg. per g.[3] reported from this station for 80%-extraction flour, but was also lower than the values of 0·6–0·7 μg. per g. they obtained for other 70%-extraction flours.[2]

1. *Spec. Rep. Ser. Med. Res. Coun., Lond.* no. 287, 1954.
2. *Biochem. J.* 1945, **39**, 213.
3. Bread. London, 1954.

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*** There are two issues here :

(1) Had the 70%-extraction flour used by McCance and Widdowson an unusually high vitamin-B content? Dr. Moran says that its thiamine (vitamin B_1) was "slightly high but still within the range for a 70% flour"; but the difference even between his average for the two main consignments (1·15 μg. per g.) and the figures given by the Ministry of Food (0·7 or 0·8 μg.) seems to us substantial.

(2) Did this flour (as we said) approximate, as regards thiamine and nicotinic acid, to "the National flour of this country"? In the table at the end of his letter Dr. Moran shows that (according to his analyses) it did not come near the standard laid down for 80%-extraction flour by the Flour Order; but is he prepared to say that National flour itself reaches this high standard? In his current report (1955, p. 19) the Government Chemist gives figures for the thiamine content of non-imported National flour (straight run) that range from 1·9 to 2·1 μg. but are always below the 2·4 μg. specified by the Ministry of Food.

In view of the apparent difficulty of estimating thiamine in flour, we doubt whether any more exchange of views will be profitable until Dr. Moran, Dr. Holman, and the Government Chemist have made, and published, analyses of the same samples of National flour. It would be interesting to know precisely how much thiamine, nicotinic acid, and riboflavine would now be found in samples of National flour purchased at random in various parts of the country, and how much agreement between different analyses can be expected.—ED. L.

CONVULSIONS FOLLOWING PUDENDAL BLOCK BY LIGNOCAINE

SIR,—I read with interest Mr. Dutton's article in your issue of Dec. 31.

It is a great pity that Goldberg's [1] work on the toxicity of lignocaine is so often quoted out of its context.

This worker found that when he injected this drug into mice in 0·5% solution, it was equally toxic with procaine though it was more toxic when stronger solutions were used. Goldberg's LD50 for procaine was 1·02 g. per kg., and for lignocaine 1·07 g. per kg. It is not, however, generally realised that the giving of this dose of any drug to a 20 g. mouse in 0·5% solution requires the administration of just over 4 ml. of solvent—which may be presumed in this case to have been water. This amount of fluid is one-fifth of the animal's total weight, or four times its entire blood-volume. It will therefore be apparent that the circumstances of these experiments are in no way comparable to the injection of ordinary amounts of local anæsthetic in man, where the total volume of fluid given is rarely more than $^1/_{50}$ of the total blood-volume. Indeed it would seem possible that at the high dilutions used in Goldberg's experiments the animals succumbed to acute water intoxication before significant amounts of lignocaine or procaine could be absorbed.

There is a second factor which modifies the toxicity of lignocaine.

I found that when this drug was injected prior to thoracoplasty it had virtually no modifying effect on the vasoconstrictor action of adrenaline added to its solutions. Procaine, 'Cyclane,' and even more so amethocaine antagonised vasoconstriction under comparable circumstances. Because the vascularity of the tissues remains relatively unaltered when these latter agents are used, the addition of adrenaline to their solutions does not markedly modify their toxicity, for absorption continues at a rate only slightly slowed by the vasoconstrictor. In the case of lignocaine, however, the adrenaline greatly delays the absorption of the local anæsthetic drug, whose concentration in the blood-stream is

1. Goldberg, L. *Svensk tandläk. Tidskr.* 1947, **40**, 819.

never allowed to reach a dangerous level. Relatively much larger quantities of it can therefore be tolerated. It is probably for this reason that all the accidents which have been reported [2–7] after the use of lignocaine have occurred in patients in whom no adrenaline has been used. Mr. Dutton's case is no exception in this respect.

It would therefore seem that the best results with lignocaine will be obtained by those who accept 500 mg. as a maximum safe dose, and who use the solutions containing adrenaline. These conditions in fact impose little limitation on the use of the drug, which is effective for long periods in 0·25% solution. Further, though Carnegie and Hewer [8] found that the best vasoconstriction was obtained with 1 : 250,000 adrenaline it is still possible, in the scalp at least, to obtain pronounced vasoconstriction with as little as 1 : 1,000,000. There should therefore never be any necessity to exceed the maximum safe total dose of adrenaline, which is 0·5 mg.

I trust that these facts will help to dispel much of the confusion which has arisen concerning lignocaine, and in future make safer the use of this most valuable agent.

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DOMICILIARY CONSULTATION IN PSYCHIATRIC PRACTICE

SIR,—Dr. Denis Leigh (Dec. 17) expresses the opinion that the "family doctor is well advised to steer clear of psychotherapy other than simple supportive measures," no doubt for the reason that "the present generation of practitioners is almost untrained in psychiatry." Yet in discussing the figure for outpatient referrals from general practitioners he observes, perhaps rather naïvely, that "it seems that the general practitioner himself deals with most of his psychiatric patients."

Clearly Dr. Leigh regards psychiatry as a field for the expert only. This follows inevitably from a view of mental illness, held by many well-known psychiatrists, according to which the symptoms are random physical expressions of the disorder, interesting to assess in relation to other bodily events but without meaning in themselves.

There is, however, another view of the psychiatric patient, according to which he is a "living," changing person, reacting to other people who are reacting to him, whose symptoms are an essential part of his whole being and a means of communicating his "shut-out" feelings and emotions to others, including his doctor. This view is frightening to those whose need is to keep everything "scientific"—i.e., in their control—and fear recognising their own emotional responses to the patient. But it does provide some sort of approach to an understanding of how the general practitioner manages to help his psychiatrically ill patients.

All my clinical experience has confirmed that people *do* react to one another, that the patient with a symptom is no exception and neither is his doctor. It might be platitudinous to repeat this were it not for the existence of an influential body of psychiatric opinion whose need seems to be to deny the existence of these emotional relations, or, admitting to their existence, to deny that they have any significant rôle in the cause or course of the illness.

The mechanistic view, which regards the symptom as a manifestation of the patient's "neuroticism," precludes acceptance of the view that the symptom is a means of communication, and that its very existence depends on the response which it secures from the "other person." A patient may have asthma, by means of which symptom the "other person" is made aware of his distress and emotionally compelled to act to relieve it. The symptom can be the patient's way of saying to the other person: "I am in a desperate state and only your loving concern can save me; but, make no mistake about it, the situation is deadly and if you do not recognise that and treat it as such then I shall die." If a child is dying of hunger although there is milk beside him, the spontaneous reaction is to feed the child before scolding him or even treating him. In my view, if he fails to appreciate the emotional significance of the symptom, which I consider the mechanistic view makes inevitable, the psychiatrist may be putting his patient in grave peril.

Fortunately most people not expert in psychiatry, including general practitioners, do react quite spontaneously to their patients' demands for help and give it to them in one way or another. True, not every doctor has the "feel" for helping psychiatic patients fully developed, but a great many do.

Here, then, is a possible explanation of Dr. Leigh's puzzling referral figures. When one remembers that minor psychiatry represents a third of all general practice, it is encouraging to realise that the rank and file of our profession can and do help their patients—even their neurotic ones. I wish to associate myself with the views expressed in the excellent letters by Dr. Balint and Dr. Hopkins (Dec. 31), that general practitioners can and should be helped to develop their innate capacities for psychotherapy, for they alone have the numbers sufficient to cope with the needs.

London, N.W.3. N. CHISHOLM.

DANGERS OF RAISING FOOT OF BED

SIR,—Raising the foot of the bed is undoubtedly of value in true peripheral circulatory failure (from hæmorrhage or vasomotor collapse) or in profound anæmia where cerebral anoxia is causing distress. Under these circumstances, bed-blocking aims at increasing venous return, and hence cardiac output *from a healthy heart*, and/or increasing cerebral blood-flow. Before the use of infusions and controlled respiration, bed-blocking as a measure of resuscitation in postoperative collapse was both safe and effective. With the advent of both these adjuncts to surgery, however, I submit that bed-blocking in a patient who has received an intravenous infusion, with or without controlled respiration, is a dangerous if not on occasions a lethal procedure.

The difficulty of estimating blood-loss during an operation tends to make replacement therapy err on the side of excess. Furthermore, controlled respiration changes a normal negative thoracic pressure to a positive one, causing a greater or lesser degree of venous pooling in the great subthoracic venous tree. During an operation, these two factors may well act in opposition, thus maintaining a relatively normal physiology. When, however, voluntary breathing becomes established and the patient returns to the ward, the change to a normal thoracic pressure will release the venous pool, and may, in a heart whose reserves are limited by disease or old age, cause incipient right-sided heart-failure. In a case of this nature, bed-blocking may tip the balance into severe acute cardiac failure, which may be unrecognised and fatal.

The first indication of central failure will be a falling blood-pressure and a rising pulse. We have all been taught that this state of affairs in a postoperative patient represents peripheral failure, for which bed-blocking is part of the treatment. It may of course be peripheral failure, but if it is treated as such, when it is, in fact, central failure, it will almost certainly be fatal.

The practical aspect of all this is fairly obvious. It is not easy to distinguish central from peripheral failure in the semiconscious or unconscious patient. More often than not, a drip trolley is ready by the time the house-surgeon arrives, and treatment aimed at combating peripheral failure is rigorously pursued without a complete appraisal of the situation. The rather more imaginative houseman may well use hypertensive additives in the

2. Ansbro, F. P., Blundell, A. E., Sweeney, J. C., Bodell, B., Andorko, J. E. *Curr. Res. Anesth.* 1954, **33**, 406.
3. Crawford, O. B. *Anæsthesiology*, 1953, **14**, 228.
4. Gordh, T. *Anæsthesia*, 1949, **4**, 4.
5. Grimshaw, C. *Brit. med. J.* 1952, i, 488.
6. Powell, W. E., Nowill W. K. *Curr. Res. Anesth.* 1953, **32**, 350.
7. Safar, P. *Ibid.*, 1954, **33**, 98.
8. Carnegie, D. D., Hewer. A, J. H. *Lancet*, 1950, ii, 12.

drip, and a transient rise in blood-pressure will assure him that the correct treatment is being given.

Following 2 deaths from postoperative collapse which had been treated with noradrenaline drips and high bed-blocking, which at necropsy showed acute heart-failure with pulmonary œdema, I employed as a routine in such cases digitalis, aminophylline, and even Fowler's position. The results were most gratifying and were certainly not attended by the hazards of bed-blocking and hypertensive drips.

In conclusion, I submit the following observations which may give thought to others who are often called on to treat postoperative collapse:

(1) Central failure is a more common cause of postoperative collapse than peripheral failure, in those patients who have received infusions during operation. This is the result of overloading and (if the infusion is not blood) of cardiac anoxia due to hæmodilution. This especially applies to the aged and to those with cardiac disease.

(2) The treatment of central failure in mistake for peripheral failure is exceedingly dangerous but the reverse is not so.

(3) Hypertensive additives are lethal drugs and, I believe, have very little place in treating postoperative collapse except when hypotensive anæsthesia is employed.

(4) A falling blood-pressure does not necessarily indicate peripheral failure.

(5) We all appear to be too "drip-conscious," without stopping to realise why we are employing them.

London, S.W.1. C. LANDON SMITH.

HEALTH CENTRE OR GROUP PRACTICE?

SIR,—I am much interested in the correspondence on this subject. I should like to strongly support Dr. Stephen Taylor (Dec. 31). In 1942 I wrote[1]:

"*Health Centres.* A glance at the Diagrams shows that here the Doctor has at his immediate beck and call a trained staff. He is in close touch with his colleagues and all the Welfare Workers. Example. Mrs. Smith comes to consult the Doctor and is ordered home to bed. Mrs. Smith replies 'I cannot possibly do that Doctor I have my husband and family to look after.' The Doctor here is able to reply 'that is easy take this note over to the welfare workers' room they will fix things up for you.' What a vast improvement is here on the decaying past."

Is not this truer even today than when it was written many years ago?

Worthing. HAROLD LEESON.

CONSULTANTS IN DERMATOLOGY

SIR,—Dr. Franklin's letter (Dec. 31), in which he states that I am wrong about young trainees qualified to practise both dermatology and venereology (Dec. 17), is interesting, but obviously his counter-statement refers to only one clinic. Surely the fact that the respective groups of dermatologists and venereologists are against dual appointments, and the endorsement of this opinion by the Central Consultants and Specialists Committee, proves an overwhelming majority.

Dr. Franklin's further allegation that higher academic qualifications, whilst required in dermatology, are not in venereology is entirely fallacious. In 1948 some long-established venereologists, just as similar practitioners in dermatology and other special subjects, were accepted as consultants by virtue of their standing in the profession and amongst their colleagues, although they did not hold higher qualifications. Nowadays no applicant for a consultant post in any subject, including venereology, would be considered by any appointing committee unless he held a higher qualification, and my experience as an external assessor on various regional-board committees leaves me in no doubt as to this statement. I would further challenge Dr. Franklin by stating that up and down the country the directors of the majority of venereal-disease departments hold higher qualifications.

1. Leeson, H. H. State Medicine or What. High Wycombe, 1942.

As a past-president of the Medical Society for the Study of Venereal Diseases, which publishes what is now the only journal on venereal disease in the English language, and is mainly responsible for postgraduate teaching in this country, I cannot recall ever having enjoyed the presence of Dr. Franklin or any of his assistants at the society's deliberations.

Sheffield. DOUGLAS J. CAMPBELL.

ACUTE CHYLOUS PERITONITIS

SIR,—Mr. Walker (Jan. 14) gives an interesting description of a non-filarial chylous peritonitis. He states that blockage of the main lymph-ducts by micro-filaria causes stasis, &c. Surely the blockage is due to an inflammatory reaction around adult filaria, now more correctly known as wuchereria?

Department of Tropical Medicine, University of Edinburgh. FRED'K J. WRIGHT.

"MUNCHAUSEN'S SYNDROME"

SIR,—The tallish man, aged 26, with a right facial palsy and a "crew" hair-cut, described by Mr. Mawson last week, presented himself at the casualty department of the West London Hospital on Dec. 20.

He said that he had had a right mastoid operation in Dublin a week before, but he could no longer afford to pay the hospital bill and had discharged himself two days before and come over on the boat the previous night. He added that he had a headache and that the facial palsy had developed since he had discharged himself from hospital.

He had a right endaural incision with the sutures still in position. There were several palpable glands on the right side of the neck, but his temperature was 98°F and there was no neck rigidity. He was advised to attend an E.N.T. hospital in the morning. A penicillin injection was refused very firmly.

West London Hospital, W.6. A. R. BEARN Casualty Officer.

"SOCIAL VALUES"

SIR,—As *The Lancet* arrives some five weeks after publication, I do not know whether you have commented on the proposed ban on heroin. If the letter in the *Times* of Nov. 30 signed by Sir Russell Brain and other eminent signatories has not astonished you as it has me, I would like to comment on an important implication of this letter. The signatories escape responsibility, whether or not the ban on heroin is justified, by saying that the use of heroin must be decided by social values.

To me, such a view is totally abhorrent. The same argument led to attempts to murder the insane in the asylums of Nazi Germany, fortunately frustrated by public opinion led by the Director of Bethel-Bielefeld.

Many things may be socially good (and I freely admit that the relief of suffering is). But "love thy neighbour as thyself" is the second Commandment—the first is "love the Lord thy God with all thy heart . . ." Medicine relieves pain because it is good to do so in the sight of a Force greater than man: secondarily man benefits. The motivation is paramount. Medicine derives its ethos from natural law; its value is absolute.

To admit the social motivation of medicine will degrade it to a mere service to the Welfare State (or may be, the Welfare World). Of course, all sensible physicians will agree with precautions to prevent heroin addiction, but they cannot admit the right of the State (a social organisation) to ban their use of it to relieve pain (a divinely imposed duty). Nowadays social consequences are too often given as a reason for medical research and action. Only a few weeks ago Dr. Bronte-Stewart and his colleagues (Nov. 26) sought to justify their investigation into the relation of coronary heart-disease and diet by saying that coronary disease kills or injures "men our community can little afford to lose."

True, these authors quickly recovered themselves, but the remark ought never to have been made. Inquiries into the cause of disease are good just because it is good to save the individual human being from suffering. That is a sufficient and full justification.

Department of Social Medicine,
and Public Health,
University of Malaya. T. A. LLOYD DAVIES.

ECLAMPSIA

SIR,—I would like to answer Dr. Salzmann (Jan. 7) by referring him to an account, just published, by Professor Lambillon, concerning his experience with toxæmia and eclampsia in the Belgian Congo.[1]

While visiting the U.S.A. Professor Lambillon was struck by the high frequency (10%) of severe toxæmia among the coloured women everywhere in the southern States. These were getting the same antenatal care as their white sisters in the North, among whom eclampsia is very rare but latent pre-eclampsia (according to Professor Lambillon) is still very common although their diet is high in protein.

In the Belgian Congo until twenty years ago eclampsia was unknown among natives; but nowadays the frequency of this disease is rising in towns, where people from the rural districts are getting plenty of European food, to which their constitution must adapt itself. Even now there is a district, with a population of two million, where not a single case of toxæmia has ever occurred; here, according to tradition, pregnant women drink only water; their diet is regarded by Professor Lambillon as inadequate; yet it seems to suit expectant mothers better than the adequate European diet.

The ratio of boys to girls born in the Belgian Congo is the same as elsewhere in the world.

Amsterdam. R. SCHUURMANS.

FOOD-POISONING

SIR,—Your editorial last week will be widely welcomed by most medical officers of health, and, representing the medical practitioner's viewpoint, must command attention.

I am a little disappointed that you did not stress two factors which contribute to the over-large figure of 39% of all incidents reported as "cause unknown."

As a medical officer of health of a borough many of whose residents spend their working day in the city and partake there of midday meals in hotels, cafés, and restaurants, I find many incidents which cannot be investigated. This must be the experience of other medical officers in the Home Counties and outside other great towns.

Another factor is that, in this antibiotic age, many patients have recovered before notifications are forwarded to the local medical officer. Sometimes the notifications are sent in with the monthly accounts. Investigations at this stage are, of course, quite useless, and the medical officer must feel unhappy at the loss of so much opportunity of adding to his local knowledge of the essential causes of food-poisoning.

I do not think that legislation has run ahead of public opinion. I was recently approached by the secretary of a local women's citizens association to take action with regard to the sale, on open fish counters, of certain food which would not be cooked, and in many other instances public opinion is rebelling against careless practice. No-one can incriminate cigarette ash, though cigarette-ends in bread are rather revolting; but surely let us first get the hygiene right and then tackle the bigger question of the unknown "virus."

I quite agree with on-the-spot investigation by the medical officer of health, provided he has the assistance of a team with local knowledge, and a "free" hand to investigate.

Public Health Department,
Town Hall, Beckenham,
Kent. L. R. L. EDWARDS.

1. Lambillon, J. *Ciba-Symp.* 1955, **3**, 138.

HORMONAL EFFECTS OF CHLORPROMAZINE

SIR,—Treatment of 200 psychiatric cases with chlorpromazine ('Largactil') has shown us that this drug produces far-reaching endocrine changes, commonly including galactorrhœa,[1] which are apparently due to transient partial impairment of the hypothalamus. We describe here the effect of chlorpromazine on secretion of anterior-pituitary tropins in man and animals.

Method

Chlorpromazine was administered to the patients thrice daily in doses ranging from 25 to 100 mg., together with vitamins of the B complex.

Chlorpromazine was administered subcutaneously to 35 rats at a dosage level of 10 mg. per kg. body-weight, and to 20 rabbits at a dosage level of 1 mg. per kg.

Results

Follicle-stimulating Hormone (F.S.H.) and Luteinising Hormone (L.H.)

One patient, a 16-year-old girl with a long-standing psychic disorder, probably schizophrenic, had increased gonadotropin values before treatment was started. These values increased, together with those for œstrone, at the fifteenth to twenty-fifth day of treatment (see accompanying table). Another

URINARY EXCRETION OF HORMONES, BEFORE AND DURING TREATMENT WITH CHLORPROMAZINE, IN A 16-YEAR-OLD GIRL

Day of treatment	F.S.H. (R.U. per litre)	L.H. (R.U. per litre)	Œstrone (I.U. per litre)
Before	200	100	10
1st–14th	200	100	10
15th–25th	1000	500	50
26th–36th	200	100	10

patient, a male who was a borderline case of schizophrenia, before treatment excreted F.S.H. 100 rat units (R.U.) per litre of urine and no L.H. On the eleventh day of treatment the values went up to F.S.H. 200 R.U. per litre and L.H. 100 R.U. per litre. This increased hormone production was maintained for another fourteen days.

In 15 mature female rats vaginal smears were examined daily. In 10 there were typical and regular patterns of the sexual cycle, averaging one-day œstrus followed by four-day anœstrus. After this cycle was clearly established, subcutaneous injections of chlorpromazine were started. From that day onwards the pattern of the cycle changed to five-day œstrus followed by five-day anœstrus. This periodicity prevailed even in animals which had shown an irregular pattern of cycle before treatment was started. When injections were discontinued after 8 weeks, the former pattern of cycle gradually returned in all the rats. Intraperitoneal injections of chlorpromazine produced permanent anœstrus.

Prolactin

25 female patients were daily examined for production of colostrum or milk. Before chlorpromazine treatment no colostrum could be obtained from their nipples. Within two weeks after treatment was begun, 17 showed colostrum on pressure or even pronounced galactorrhœa. The remainder produced colostrum for a short period, lasting three to seven days; 6 had only unilateral secretion of colostrum.

10 immature female rabbits, after being primed with œstrogen, received subcutaneous progesterone 0·5 mg. daily, together with chlorpromazine 10 mg. per kg. body-weight. After time-intervals varying from 17 to 34 days they were killed and the generative phase of the uterus was determined microscopically. Whereas in control animals the second phase disappeared spontaneously after seventeen days of continued progesterone injections, the second phase was maintained in rabbits which had chlorpromazine added to the progesterone. So far we have been able to keep up the second phase for thirty-four days, which may indicate endogenous production of prolactin. The mechanism of this effect is being studied.

Corticotrophin

4 patients were checked daily for urinary 17-ketosteroid output in the urine. Before treatment 3 female patients had

1. Winnik, H. Z., Tennenbaum, L. *Pr. méd.* 1955, **63**, 1092.

values ranging from 10 to 14 mg. per day; 1 male patient had values around 18 mg. per day. When chlorpromazine treatment was started, in the females the values decreased between the first and eighteenth day to levels near zero, whereas those in the male patient decreased in the first ten days of treatment to levels of 0·6–6 mg. per day. Later the levels in all the patients returned to those before treatment, though chlorpromazine medication was continued. There was a concomitant, but insignificant, decrease of 17-hydroxycorticoid excretion. During the period of extremely low 17-ketosteroid excretion, we sometimes, but not always, found a gradual increase of blood corticotrophin which, however, returned to normal levels when the 17-ketosteroids in the urine returned to normal.

Somatotrophic Hormone (S.T.H.)

In patients treated for two months, no acromegalic changes were discerned in photographs taken in profile, but their weight increased noticeably.

In rats treated for over two months with chlorpromazine (10 mg. per kg. body-weight), a definite stunting of growth and development was discernible. 5 female and 5 male rats were given daily injections of chlorpromazine 10 mg. per kg. and their growth curve was compared with that of 5 male and 5 female control rats. Whereas no difference in weight was noted between the initial weights of 30–90 g., obvious impairment of growth became visible later on. Within two months the female control animals reached a weight of 125 g., while the treated animals reached a maximum weight of 95 g. Similar results were obtained in male animals, in which the weight of the controls rose to 200 g., whereas the treated animals remained at 125 g. Then they were given daily 10 B.U. growth hormone subcutaneously, whereupon they attained the weight of the control animals within a further two months.

Thyroid-stimulating Hormone (T.S.H.)

2 patients had their basal metabolic rate (B.M.R.) checked weekly before and during treatment. Before treatment their B.M.R. was + 35% and + 12% respectively. The weekly readings of B.M.R. were as follows:

Case 1: from + 35% to + 20%, + 36%, + 22%, and + 35%.
Case 2: from + 12% to + 18%, + 6%, + 5%, and + 17%.

Thus, there was a slight tendency of the B.M.R. to decrease during the first one to three weeks of treatment. The significance of these results needs further investigation.

Discussion

The mechanism of the endocrine disturbances observed has not yet been clearly defined, since it involves impairment of the hypothalamus or the formatio reticularis as well as peripheral effects which may be humoral, vegetative, or toxic.

The temporary inhibition of the hypothalamus may be explained as follows:

The hypothalamus through its portal veins as well as through its cholinergic and adrenergic fibres regulates the anterior lobe of the pituitary gland. The six tropins cause production of hormones in the peripheral glands by the "push-and-pull" principle. Thus F.S.H. stands in reciprocal relation to œstrone, L.H. to progesterone and testosterone, corticotrophin to the cortical steroids, and T.S.H. to thyroxine and tri-iodothyronine. These tropins should be called "balanced tropins" since they are permanently kept in balance by the peripheral hormones which they produce. On the other hand, there exist two "unbalanced tropins" which apparently do not produce secondary hormones, but instead exert a direct hormonal effect; thus prolactin produces milk, and S.T.H. has an anabolic effect on bone and muscle growth. It is obvious that neither milk nor muscles can balance their respective tropins.

The theory of the balanced and unbalanced tropins proposed by us would explain the surprisingly high prevalence of lactation in female patients under chlorpromazine treatment. It is possible that a similar effect of growth hormone can be recognised behind the anabolic effect regularly found in all patients under chlorpromazine treatment—namely, rapid gain in weight.

Our hypothesis of the balanced and the unbalanced tropins explains also the temporary fluctuations in hormonal output described by us. It is well known that stunting of the hypothalamus is followed by impaired function of the peripheral hormones. It has been shown in our experiments with chlorpromazine that this imbalance is ended in the case of the balanced tropins within two to three weeks. There is, however, no ready readjustment in the case of the unbalanced tropins.

In addition to the balancing effect within the hypothalamus/pituitary/peripheral-gland axis, there obviously exist additional peripheral effects which are directly engendered by chlorpromazine. Thus the prolonged effect of progesterone on the rabbit uterus could also be explained as a humoral effect (acetylcholine antagonism), the immediate depression of the 17-ketosteroid excretion as a vegetative effect, and the stunting of growth in rats as a toxic effect (interference with metabolic enzyme systems).

In summary, the manifold effects of chlorpromazine can be largely explained by partial block of the hypothalamus followed by impairment of most of its functions. The effects of hormonal inhibition thus produced in man and animals result in temporary increase of production of the so-called "balanced tropins": F.S.H. and L.H., as well as corticotrophin and T.S.H. On the other hand, there is a prolonged increase of the "unbalanced tropins," especially prolactin resulting in production of colostrum or galactorrhœa. In addition to these central effects, there exist peripheral effects which may be humoral, vegetative, or toxic.

Our thanks are due to our colleagues, Dr. A. Jarus, Mr. A. Eviatar, and Mr. N. Ben-Hur, for their help.

Department of Applied Pharmacology, F. G. SULMAN
Department of Psychiatry, H. Z. WINNIK.
Hebrew University—Hadassah Medical School, Jerusalem, Israel.

A RARE COMPLICATION OF CHLORPROMAZINE TREATMENT

SIR,—Gäde and Heinrich [1] have reported the unusual complication of secretion from the mammary glands in three female patients who were taking chlorpromazine. We would like to report a similar occurrence in a virgin aged 21 years.

The patient had long been subject to generalised jerky choreiform movements, attributed to thrombosis in or about the basal ganglia following diphtheria at the age of $4^1/_2$. These movements were made worse by anxiety or emotional disturbance, and disappeared or became less during relaxation, during sleep, or after the ingestion of a moderate quantity of alcohol. Secondary sexual characters were normally developed for her age. Her sexual history was unremarkable. Her periods were regular every twenty-eight days, lasted for three days, and were uncomplicated by pain. She had variable premenstrual tension with some depression.

She was admitted to a neurosis unit on Sept. 19, 1955, and was treated with chlorpromazine 25 mg. t.d.s. Her breasts began to enlarge, and on Oct. 14 began to secrete sufficiently for her to have to wear pads to prevent staining of the clothes. The quantity of daily secretion was unknown, but the fluid was milky and contained fat globules. She failed to menstruate on the expected date (Oct. 30), but menstruated normally at the next period. Gynæcological examination showed no apparent abnormality apart from the secreting breasts. The chlorpromazine was stopped on Nov. 2, and secretion ceased on Nov. 16. Administration was resumed on Nov. 24, and secretion again occurred on Nov. 30 and has continued. Chlorpromazine has helped her movements and disturbed emotional state considerably, and the beneficial action is considered by the patient to outweigh the disadvantage of some breast secretion.

Apart from the three cases already mentioned, no other examples of this effect of chlorpromazine seem to have been reported. This is somewhat surprising in view of the very extensive use of this drug.

W. K. MARSHALL
Bexley Hospital, Kent. D. M. LEIBERMAN.

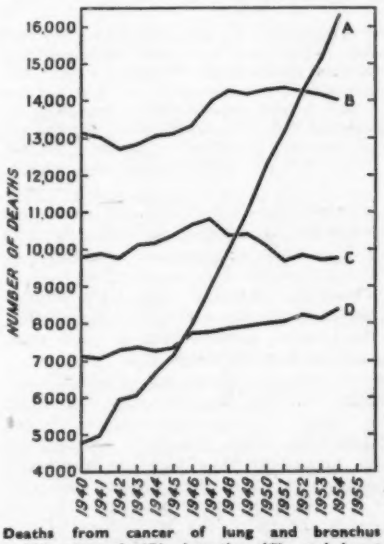
1. Gäde, E. B., Heinrich, K. *Nervenarzt*, 1955, **26**, 49.

THE EPIDEMIOLOGY OF LUNG CANCER IN NEW ZEALAND

SIR,—The title of this article (Jan. 7) caused pleasurable anticipation, for it is essential that information relating to the ætiology of carcinoma of the bronchus shall be available from all possible sources. However, pleasure ebbed away when reading revealed that Dr. Eastcott has failed to note the scientific evidence from many parts of the world that there is a causal relationship between the number of cigarettes smoked and the incidence of this disease.

The mere setting out of the yearly consumption of tobacco, without relating this to the methods of smoking, neglects the most important change in our habit during the past fifty years. It is probable that we in this country led the world in the number of cigarettes smoked per head of population until 1925. Certainly we were far ahead of the United States until then. Between 1910 and 1925 there was an increase of 100% in cigarette consumption in this country. The deaths from carcinoma of the bronchus that clinicians have seen in the past five years occurred mainly in men who commenced smoking in the 1914–18 war. Smoking habits are acquired before the age of 30 and seldom change in an individual after this. This factor merited investigation in New Zealand.

We are faced with a very serious epidemic of lung cancer here, as the accompanying figure shows. This contrasts the deaths with those from cancer in other common sites. I know of no scientific publications which have shown any change of urbanisation sufficient to explain this alarming rise. It is explicable on the vast increase of cigarette consumption, and herein lies hope of dealing with the epidemic. Articles purporting to be scientific but which fail to analyse this aspect do a great disservice to those who have shed light on this problem by patient research. The peak of the epidemic is not in sight, but its height can surely be diminished if we will act on the ascertained facts and ensure that the public is informed constantly of the risks of cigarette-smoking. The Government is not prepared to do this yet, but surely, Sir, we can expect informed medical writing not to neglect it.



Deaths from cancer of lung and bronchus (A), stomach (B), intestine (C), and heart (D): England and Wales, 1940–54.

Central Middlesex Hospital, London, N.W.10. HORACE JOULES.

ATMOSPHERIC POLLUTION

SIR,—Your article of Jan. 7 on the Investigation of Atmospheric Pollution makes one ask whether industrial smoke and the smoke from domestic coal fires is really all there is to the heavy pollution and contamination of the air we breathe. Has the time not come for directing our attention also to other common sources of air pollution? Outdoors it is the ever-increasing admixture of exhaust fumes from motor vehicles, particularly from Diesel-oil-driven vans and buses which deserves close study and efficient action. Is it really beyond the wit of engineers and chemists to devise decontaminators, fitted to the exhaust pipes, which would absorb or render harmless the hydrocarbons and the carbon monoxide and possibly other poisonous constituents of these dangerous gases? In the meantime it might not be a bad idea if motorists waiting in traffic queues were compelled to switch off their engines which throw out unmeasured quantities of highly toxic exhaust fumes.

Turning now to air contamination indoors, may I make a plea for air-sampling and for research into the tobacco-smoke pollution of the air we are compelled to inhale in buses, in picture and concert halls, in pubs, and wherever else people meet? It could perhaps be argued that smoke abatement (not unlike charity) should begin at home. Whatever good is being done by the creation of smokeless zones and by wider application of technological knowledge to the reduction of coal smoke from factories and from home fires, much of it, I feel, is undone by the perpetual and still increasing air contamination with tobacco smoke.

Apart from its irritating effect on the mucous membranes and on the air-passages of both smokers and passive non-smokers and its provocation of coughing, which naturally increases the bacterial content of the atmosphere in closed rooms, the burning of cigarettes and pipes takes up a considerable amount of oxygen from the air we are left to breathe. Air-sampling and analysis of the O_2,CO_2, and CO content of the atmosphere in smoky rooms and public vehicles would, I believe, reveal a state of affairs that might shock the guardians of our public health.

Stanhope, co. Durham. E. G. W. HOFFSTAEDT.

MALIGNANT DISEASE OF THE RESPIRATORY SYSTEM

SIR,—In a statistical survey of this subject [1] I compared the death-rates below age 70 from (*a*) all diseases of the respiratory system except cancer, and (*b*) cancer of the respiratory system, and suggested that possibly the considerable increase in the death-rate from lung cancer in the period under review had resulted partly from better treatment of other lung diseases as manifested by the substantial reduction in the death-rate therefrom during the same period.

It has been suggested that a split-up of these death-rates at the age of 50 could be of interest since it requires some 20–30 years of cigarette-smoking to produce lung cancer, and thus if there is any statistical correlation between the two it will be apparent only in death-rates after the age of 50.

DEATHS PER 100,000 MALE POPULATION OF ENGLAND AND WALES FROM DISEASES OF RESPIRATORY SYSTEM

Diseases	1932	1938	1948	1949	1950	1951	1952	1953
All except cancer :								
Ages 50–70 ..	419·7	360·2	412·3	470·2	403·1	530·2	377·3	404·4
Ages below 50	171·9	127·5	82·4	76·0	57·0	54·2	40·8	30·8
Cancer :								
Ages 50–70 ..	48·8	77·8	154·2	162·5	178·7	193·4	203·7	213·2
Ages below 50	3·3	5·6	10·4	10·3	10·4	10·5	10·4	10·3

The death-rates for males up to age 50 and from 50 to 70 are set out in the accompanying table. The results are quite remarkable and appear to establish a definite correlation between lung cancer and the tobacco habit. This conclusion is of course supported by the fact that during the period reviewed there has been no

1. Bradshaw, F. L. *Lancet*, 1955, i, 861.

appreciable reduction in the 50–70 death-rate from diseases of the respiratory system other than cancer, while during the same period the corresponding death-rate from lung cancer has increased more than four times. The complementary death-rates below age 50 show that the reduction for diseases of the respiratory system other than cancer has been very substantial, while the increase in the corresponding rate for lung cancer, although substantial up to 1945, has since remained practically constant.

A similar division has been made of the death-rates for women, but this merely confirms the superiority in its resistance to disease of the respiratory system of the female compared with that of the male. The 50–70 death-rate from diseases of the respiratory system other than cancer has fallen by half over the period, while the corresponding death-rate from lung cancer has only doubled. In 1953 the 50–70 death-rate from lung cancer for men was over eight times that for women. I am not sending the figures for women as I do not wish further to encroach on your space.

London, W.1. F. L. BRADSHAW.

URETERIC CATHETERISATION

SIR,—I was very interested in Mr. Tresidder's method, described in your issue of Dec. 24. For many years, at St. Bartholomew's Hospital, gum-elastic ureteric catheters have been placed in a cotton container in the form of a tube. 1 cm. in diameter, and sterilised in a formalin cabinet. When the catheter is boilable, however, Mr. Tresidder's innovation of Penrose rubber-tubing seems excellent.

I would like, however, to sound a note of warning about the plastic ureteric catheter. The instrument has not yet been perfected, and the tip is quite liable to break off at the first hole. Should this happen in the bladder, the fragment can of course be easily removed with suitable forceps, but if it breaks off in the pelvis of the kidney or ureter the consequences may well be troublesome. I have not so far seen this misadventure in the upper urinary tract, but suggest that each catheter should be carefully examined before it is introduced along the cystoscope, and if there is any doubt about its reliability it should be discarded.

London, W.1. A. W. BADENOCH.

PRODUCTION OF CODEINE

SIR,—The increased world production of morphine for therapeutic purposes is, according to the report of the U.N. Permanent Central Opium Board,[1] due to the requirements of codeine. This accounts for 80–90% of the morphine manufactured, which amounted to 84 tons in 1954. Although this figure is small compared with that for illicit opium, it is none the less remarkable, since codeine is a drug of such little therapeutic value.

Codeine is used universally, but illogically, for the relief of pain.

Thus during the last year 200 oz. of codeine was dispensed in the London Hospital as tab. codein. co. (800,000 tablets), 190 oz. as mixture of aspirin, phenacetin, and codeine, and 31½ oz. as the linctus. This is untidy and extravagant therapeutics because the amount of the drug in two codeine compound tablets or in half an ounce of the mixture contributes negligibly to its analgesic effect; even morphine gr. ¼ given by mouth is less effective than aspirin gr. 10.[2] Presented in this way codeine only constipates, and the amount in a drachm of linctus codeinæ will not even do this. Very little was used for the relief of diarrhœa, and for this purpose there are suitable alternatives.

It seems reasonable to end the world production of codeine.

London Hospital, E.1. EIRIAN WILLIAMS.

1. *Daily Telegraph*, Jan. 9, 1956.
2. *Lancet*, 1955, ii, 26.

BLOOD-TRANSFUSION

SIR,—I fully support Dr. Shillitoe's statement (Jan. 7) that "experience shows that in reading difficult or doubtful agglutinations the opinion of the technician of a few years' experience is greatly superior to that of a doctor who has only been doing the job for a few months."

At this centre I have been privileged to teach ABO and D grouping, preparation of compatible blood, and care and maintenance of a blood-bank to several hundred doctors and technicians in the past few years. Each course of instruction lasts 5 days.[1] As was pointed out in your leading article (Dec. 31), fear of a mismatched transfusion has made junior staff, both medical and technical, unwilling to take the responsibility of declaring compatibility. This fear can only be overcome by adequate training and experience, and the technicians and junior pathologists I have met are trying very hard to get the experience necessary to give them confidence in their results.

As Race and Sanger[2] so aptly put it: "to achieve accuracy a long apprenticeship of error seems necessary. A friendly but silent atmosphere is essential. Given silence, there is still danger of the mind wandering, this it must not be allowed to do, however routine the tests may be . . ." It is useless to expect reliable blood-grouping and compatibility tests unless staff are given relief from their routine work in order to undertake proper training in simple blood-group work. After a basic course, experience is best achieved by repeating the work of a more practised worker. Increasing experience will reveal personal shortcomings and the limitations of the technique and the materials used, and, possibly most important of all, teach when to refer problems for advice.

When sufficiently experienced, all staff responsible for the supply of compatible blood have one main problem—the lack of time necessary for full safety. From the many discussions during the courses held here it is obvious that a high proportion of the urgent requests for blood-supplies are due to lack of planning and/or consideration for the pathological laboratory. Given the time, and the training, both the technicians and the assistant pathologists can supply compatible blood.

Meanwhile, if I required a blood-transfusion I would put my faith in the trained and experienced technician for the compatibility test. Those who perform only an occasional blood-grouping, under pressure for an emergency case, cannot hope to possess the technical skill or the ability of interpretation necessary for the selection of compatible blood. Indeed the internal organisation of each unit should be such that this is never necessary.

Finally it must be stressed that the possession of an academic qualification may automatically command a certain salary but does not necessarily indicate ability to undertake compatibility tests. Similarly, unqualified laboratory workers may well have had the necessary training and experience to make their results safe and acceptable. This is a decision which can only be made by the pathologist in charge of the laboratory in the light of his knowledge of the individual, and the issue must not be confused by administrative or political red-herrings.

Regional Transfusion Centre, Sheffield. I. DUNSFORD
Senior Scientific Officer.

SIR,—In your leading article (Dec. 31) you mention the Danish cards for simultaneous ABO and Rh grouping[3 4] and quote from the article referred to[3] 6 errors out of 15,000 groupings on the cards. And you continue: "Unfortunately an error of 4 per 1000 cannot be disregarded when blood-grouping is involved . . ."

An error of 6 per 15,000 does not correspond to 4 per 1000, but to 4 per 10,000. Furthermore, the 6 errors

1. Dunsford, I., Bowley, C. C. Techniques in Blood Grouping. Edinburgh, 1955; p. 83.
2. Race, R. R., Sanger, R. Blood Groups in Man. Oxford, 1950; p. 163.
3. Eldon, K. *Dan. med. Bull.* 1955, **2**, 33.
4. Jordal, K. *Ibid*, p. 40.

occurred during a period of two years, the material consisting, in fact, of 30,000 card groupings. Of the 6 errors, 2 occurred because the cards at that time were not protected against moisture; and accordingly the reagents on some cards had been completely spoiled during a damp summer month. Since then every card has been packed in a moisture-proof envelope with control paper enclosed for an easy check on the effectiveness of the protection. The other errors were due to grave disregard of the directions for use.

Finally I should like to point out that the groupings in this material were carried out by a rather large number of doctors and technicians in various hospitals. Thus, the results should not be directly compared with those published for other new methods, which usually relate to the worker's own laboratory only.

Copenhagen. KNUD ELDON.

WERTHEIM'S HYSTERECTOMY

SIR,—I read with interest Mr. Mills's account last week of his modified procedure based on the Howkins combined abdomino-vaginal hysterectomy, as I have been using an exactly similar method for the last three years. During that time I have treated in this way about fifteen cases of carcinoma of the cervix, though not, as yet, any of carcinoma of the body of the uterus.

Mr. Mills's statements as to the increased facility of isolation and division of the parametrium can be fully substantiated, while the use of a pack at the conclusion of the vaginal part of the operation, by raising the contents of the pelvis higher up into the abdomen, makes the abdominal part of the operation quicker and easier. The reduced time spent in the Trendelenburg position is of value both to the patient and to the anæsthetist. While the numbers are too small to be of statistical significance, the impression is that the incidence of ureteric fistula is diminished, though just why this should be so is not apparent.

The chief disadvantage of the method is the necessity of being certain that the growth is operable, and it has been thought advisable, on one or two occasions, to open the abdomen before proceeding to the vaginal part of the operation.

Rush Green Hospital, Romford, Essex. E. GARLAND-COLLINS.

"INFECTIOUS ROSEOLA"

SIR,—Dr. Fletcher describes in his letter (Jan. 7) a small epidemic of "infectious roseola" in Palestine. The disease he describes is well known to those with tropical experience as dengue fever, spread by aedes species. In the former Netherlands East Indies the more popular name was *vyfdaagsche* or *van der Scheersche koorts* (five-day fever or van der Scheer's disease).

The incubation period is generally 5–8 days with extremes of 3–10 days. Acute onset, with muscle pains, pyrexia up to 104°F, pain on turning the eyes, slight conjunctivitis, and initial exanthema and enanthema, is common. The exanthema may differ from case to case, but usually one can see against the background of large livid maculæ after 3–6 days small, dense, vivid red, spots or papulæ beginning on the chest, waistline, hands, feet, and arms; the face is generally spared. Occasionally petechiæ are seen in the spots. After defervescence the exanthema disappears, often with fine desquamation. General lymphadenopathy is common; the spleen is not enlarged. The tongue is coated; anorexia, nausea, and vomiting are common. On lumbar puncture the cerebrospinal fluid is under high pressure, and contains an excess of albumin, glucose, and white blood-cells. A distinct leucopenia is valuable corroborative evidence. In the well-known Greek epidemic the mortality-rate was 0·03%; but usually dengue fever is a benign, though temporarily incapacitating, disorder. It has nothing to do with roseola infantum (Zahorsky). The virus of dengue, discovered by Ashburn and Craig, may be transferred to man and animals by injection of the patient's blood in the first days of fever. The virus has not been cultivated from human blood; but by repeated passage in infected mice it can be grown. There are several strains of dengue virus. The infection does not confer immunity.

Hilversum, Holland. D. P. R. KEIZER.

"OEDÈME BLEU"

SIR,—Dr. I. Macalpine and Sir James Paterson Ross in their paper last week describe a syndrome better known to a past than to the present generation of neurologists. They define it as "a not uncommon form of 'hysterical' affection of joints simulating medical or surgical disease."

The neurologist will find it hard to know what this means, and will ask why the joints have been chosen by the authors as the primary and essential seat of the condition they have described anew. He will ask also, what is the meaning of an hysterical affection of a joint, for the disturbance in hysteria is primarily one of activity and not one of structure, while the joint is a passive mechanism under the control of muscles. Surely, in the scientific sense there cannot be an hysterical affection of a joint, though there might be of the muscular control of a limb's movement at a joint.

Now hysterical paralyses of hand or foot (and this implies paralyses of muscles of forearm or of leg, as well as of muscles in hand or foot) are not usually or typically accompanied by the striking condition named blue œdema, as first described by nineteenth-century writers and now again brought to notice by the present authors. Blue œdema is a sequel only to immobility of hand or of foot due to sustained muscular spasm and the fixation it produces, the spasm being psychologically determined. In other words, it is a sequel to what the older writers called contracture (not distinguishing between active muscular spasm and fibrous changes in muscle leading to its shortening and loss of contractility).

Volume 128 of the New Sydenham Society's publications, which includes some of Charcot's clinical lectures on nervous diseases, contains the description of many such cases, which Charcot explicitly differentiated from organic paralysis and fraudulently produced states. Charcot also pointed out that the fixating spasm may disappear under chloroform anæsthesia, yet ultimately secondary tissue changes do occur so that even under anæsthesia a full range of passive mobility may not be possible.

In short, "blue œdema" is a syndrome in which the primary and the sole psychogenic factor is muscular spasm leading to fixation of joints. Secondary tissue reactions, which are not psychologically determined, are œdema, cyanosis, and changes in joints and peripheral circulation.

To label the entire syndrome as the expression of an hysterical affection of joints is wholly to misunderstand its origin and complex nature.

I say no more of the authors' inadequate references to the writings of Charcot and Babinski than that Charcot did not include hemiplegia and fraud under the heading of *grande hysterie*. In the Sydenham volume which I have cited, he explicitly differentiates muscular spasm, or "contracture," from organic hemiplegia and fraudulently produced states. To suggest that Charcot did not know the differences between these disparate states is not possible for any serious student of his writings.

London, W.1. F. M. R. WALSHE.

SIR,—One feels indebted to Dr. Macalpine and Sir James Paterson Ross for their article, which was not only interesting but also very stimulating for further consideration of the "hysterias." However, there are, I think, several points that are open to debate.

The authors often give quotations from the literature of the last century, and when they do not condemn them they appear to subscribe to them.

Thus, firstly, the emphasis on functional disability and the denial that the "vasomotor system is primarily at fault" tend, I feel, to obscure the importance of the autonomic system. This may well be not primarily—or even secondarily—deranged. But, as research increasingly indicates, it certainly acts as a mediator-effector for corticosubcortical integration in all psychogenic symptoms, whether they be called hysterical or psychosomatic. That is why the dictum "I cannot = I cannot will" is confusing, since it brings in volition.

Secondly, the reported "striking feature of concreteness of expression" is indeed characteristic, yet not as such, but in the sense of some symbolism which invariably underlies such disorders. The idea of "dirt," for instance, in its dual sense, is often clearly depicted by psychosomatic skin lesions. One can hardly agree with the authors that it amounts to thought disorder (mostly seen in schizophrenia) unless it had been tested with the usual proverb-tests, &c. To me, it appears as part and parcel of the pathogenesis, and I feel that it should simply give food for thought on the psychology and ontogenetic evolution of language rather than be given a sinister significance.

Thirdly, the statement that the patients wish for amputation "may be regarded as a degree of self-mutilation amounting to partial suicide" would seem somewhat nugatory unless it is meant to support the view that these patients were mentally ill. To call such a wish (not the act!) suicide—even "partial"—is at least inappropriate; for while on the one hand we know little of the psychology of suicide, on the other the concept of dissociation offers a much more likely psychological explanation.

Fourthly, it is suggested that "cases of œdème bleu illustrate the early *stages* of mental illness," and I think it is with this view that the authors have raised the neurotic "inaccessibility to objective evidence and reassurance," to the status of delusions—even though not "frank" ones. I think that this is not supported by the facts. A psychosis may indeed *mimic* all so-called "neurotic" states, but there is no particular reason to consider such states as a prelude to insanity. If we agree, as the authors do, that the psychogenic symptoms are vital to psychic economy, we cannot mistake the patients' desperate loyalty to such symptoms as delusion, while we can appreciate that the so-called "secondary gains" and "motives" are but the altera pars of these symptoms. There are as many psychic economics as there are individuals at any given moment, and if they occasionally result in disabilities one cannot readily speak of mental illness.

Finally, I would like to join with the authors in their protest against the confusion caused by that misnomer, "hysteria." I used, above, the term "the hysterias"; yet, unlike the schizophrenias, the epilepsies, and other such "plural" conditions, these possess nothing that is not to be found, rudimentarily at least, in the normal; they are as protean in their psychopathology as life itself.

If we all make a point of using terms like "psychosomatic," "immature and unstable personality," "conversion syndromes," and "regression states," there will be no room for so bad a name as hysteria.

The National Hospital for Nervous Diseases, London, W.C.1. G. M. JACOBIDES.

DANGER—CLINICIANS AT WORK

SIR,—One of the most stimulating aspects of medicine is the inability of its practitioners to agree on any topic whatsoever. It is no surprise to hardened readers of *The Lancet* to see (Jan. 7) that the diets so beloved and acclaimed by our distinguished elders are quite useless in the treatment of peptic ulcer. As everybody knows, ulcer is caused by stress . . . which is a condition found in prosperous, civilised communities. Ulcer is seldom seen in Afghans, who have no worries (and no X-ray machines), and was unknown to our ancestors, who suffered from famine, plague, war, and poverty . . . but never from stress.

A few pages further on we read that the time-honoured abduction splint for paralysis of the shoulder-muscles should be abandoned. Of course it should; and as for repairing hernia by sewing the conjoined tendon to the inguinal ligament (Mr. Doran, Dec. 24)—it's useless, my dear fellow . . . and if you're thinking of that chap you operated on a couple of years ago . . . forget it! He isn't really cured, as you would know if you'd shoved in a few radio-opaque markers. Talking of radio-opaque markers, Mr. Doran's lower pair of photographs repays a second glance. It will be seen that the outer marker in the conjoined tendon has not only separated from its opposite number in the inguinal ligament, but has moved twice as far from its fellow in the conjoined tendon as it was in the beginning. How come? Has the tendon suddenly doubled in length, or has the "marker," like any other foreign body in muscle, moved around a bit?

Don't let's stop. There must be plenty of other useless procedures going on in London. What about fractures of the collar-bone? We usually treat them with some elegant modification of the "three-handkerchief sling." Why? Is it to relieve pain? Try it and see. Is it to correct the displacement? X-ray it and see. Why, then? Perhaps if I may misquote Pascal, we "have reasons that Reason itself knows nothing of."

South Mimms, Herts. V. J. DOWNIE.

X RAYS FROM TELEVISION SETS

SIR,—I was interested in Dr. Chisholm's query (Jan. 7) regarding the possibility of dangerous X-ray emanations from television tubes.

Recently I and three other members of our hospital staff carried out experiments on our four television sets. Small fast dental X-ray films were placed on the glass immediately in front of the tubes, on the sides of the sets, and at other positions up to 2 feet away from the front of the set. A small disc of metal was inserted between the sensitive side and the tube, the films being kept in position by 'Sellotape.' The films were developed after periods varying from 1 to 8 weeks, and in no case was there any evidence of the films having been sensitised. The sets are standard ones with tubes ranging from 14 to 17 inches.

This test seems a fairly easy one to apply, and as a result I personally have ceased to worry about any dangerous television X-radiation.

Sutherland Dental School, Newcastle upon Tyne. G. E. M. HALLETT.

MODIFIED QUECKENSTEDT TEST

SIR,—Dr. Belton's comments last week cannot be allowed to pass unchallenged, for apart from their theoretical inaccuracy they contain implications of practical danger. His belief that the rise in cerebrospinal fluid (C.S.F.) pressure on jugular compression is due to the slowing of absorption is surely shared by very few. This rise in pressure, which takes place within a few seconds, is in fact due to an increase in the total contents of the virtually inelastic meninges which enclose blood and nerve tissues as well as C.S.F. Obstruction of the venous outflow whilst arterial inflow continues results in a rapid rise of cerebral blood-volume with consequent rise in C.S.F. pressure. The possible alteration in C.S.F.-absorption rate cannot contribute materially to this rapid change.

Dr. Belton's practical advice is that jugular compression should be abandoned in favour of forced expiration against the closed glottis by the patient. But this manœuvre is precisely that required as a contrast to the effects of jugular compression when one wishes to demonstrate an obstruction to the normal C.S.F. dynamics either in the lateral sinuses or in the spinal theca, for it increases intra-abdominal tension, compresses the

lumbar veins, and so increases the pressure in the spinal theca, irrespective of what may be happening at a higher level. One can only presume that cord compression does not occur in Dr. Belton's practice since he has always found the effects of jugular compression to be identical with those produced by straining. In that case he could well afford to dispense altogether with the Queckenstedt manœuvre, but in the interests of good practical neurology he would be better advised to carry out the full orthodox routine of recording the comparative effects of right, left, and bilateral jugular compression, together with those of coughing and straining.

Department of Neurology, University of Manchester. L. A. LIVERSEDGE.

DEATH OF PATIENT WITH ARTIFICIAL PNEUMOTHORAX

Dr. PATRICK O'ROONEY writes: "In last week's issue you mention (p. 110) the death of a patient with artificial pneumothorax. Readers are referred to a report in the *Southend Standard*. As I carry out most of the refills in the Southend area, I would be very much obliged if you would allow me to explain that this death did not take place in the Southend area."

Medicine and the Law

Payment for Drugs

THE Worcestershire Executive Council has taken action in the case of a doctor who, it was alleged, failed to collect the shilling prescription charge from patients to whom he dispensed drugs.[1] The case is of special interest because it raises questions as to the responsibilities of practitioners in regard to the collection of these charges.

The doctor told the council's investigating committee that the drugs in question were free samples which he had received from drug houses, and he did not feel justified in charging for them. He did not consider that the stocking of his dispensary with free samples was a satisfactory method, but "it saved a lot of time and they are sometimes easier to give."

He had, he said, a small stock of ordinary medicines, but having dispensed these for patients, he was often presented with the difficulty of changing a £1 note. Sometimes the patients offered to bring the charge on the next visit. In such circumstances he found it difficult ever to collect the charge. He had paid over all the charges he had received.

The investigating committee reported that it did not object to the use of free samples but deprecated their use as a source of supply. The council decided that the doctor had "abjectly failed" to collect the charges. It was agreed that £10—"a reasonably accurate estimate of the amount involved"—should be withheld from his remuneration.

The press report does not disclose the circumstances in which the doctor dispensed these drugs, but there are three possibilities:

(*a*) The drugs may have been dispensed (under paragraph 7 (9) (a) of the Terms of Service) for immediate application or administration or for use before a supply could be obtained in the ordinary way.

(*b*) The doctor may have been acting as a "dispensing doctor" in accordance with arrangements made by the executive council for patients living in a rural area or who have other difficulties in obtaining drugs.

(*c*) The drugs may have been supplied by the doctor apart from any obligation under head (*a*) or (*b*).

The liabilities of the patient and the practitioner with regard to the shilling prescription charge vary accordingly. If the drug is supplied under either head (*a*) or (*b*), the patient is liable to pay to the doctor the shilling prescription charge (N.H.S. [General Medical and Pharmaceutical] Regulations, 1954, reg. 30 [1]). The doctor is under no obligation to supply the drug except upon such payment (reg. 30 [2]); alternatively, he may dispense the drug and, if he has difficulty in recovering the charge at a later date, he may sue for it as a civil debt (reg. 34). In these circumstances, the patient's liability would appear a purely civil one to the practitioner; the patient is not under any direct obligation, civil or criminal, to the State.

The question then arises as to whether the practitioner is under a duty to enforce his right to the shilling. Here the position varies.

As to head (*a*): in respect of his duty under paragraph 7 (9) (a) of the Terms of Service, every practitioner receives a payment of 2*s*. 6*d*. per annum for every 100 patients on his list; the automatic receipt of that payment imposes a clear obligation on the practitioner to demand and account for the shilling charge.

As to head (*b*): the practitioner may claim payment for drugs supplied either on a flat-rate basis for each patient (with additional payments for especially expensive items) or on the basis of the *Drug Tariff* for every item supplied. If the practitioner claims payment on either basis, then clearly he ought to recover the shilling charge; but if he does not claim, there appears to be no obligation upon him to recover the charge and no good reason why the executive council should expect him to do so. This view of the matter appears to be confirmed by the statement in the official *Handbook for General Medical Practitioners* (para. 74) that the Minister has determined that the payment of a dispensing doctor for the supply of drugs and appliances is subject to the condition that the charges be collected and paid over.

In the case of head (*c*) the patient appears to be under no liability to pay the shilling charge, so there can be no question of the practitioner being obliged to collect it.

1. *Birmingham Post*, Dec. 29, 1955.

Obituary

HUGH SPEAR PEMBERTON

M.B. Lpool, F.R.C.P.

Dr. H. S. Pemberton, senior physician to the David Lewis Northern Hospital, Liverpool, died at his home at Neston, Wirral, on Jan. 15 at the age of 65.

He qualified in 1913 with first-class honours in medicine at Liverpool University, and joined the staff of the David Lewis Northern Hospital a year later as clinical pathologist. During the 1914–18 war he served with the R.A.M.C. After demobilisation in 1919 he was appointed junior physician to the David Lewis Northern Hospital. He took the M.R.C.P. in 1921 and was appointed a full physician in 1924. He also joined the staffs of the Liverpool Hospital for Women and of the Liverpool Radium Institute. He was lecturer in clinical medicine at Liverpool University. The whole of his active clinical life was thus associated with Merseyside, but his greatest devotion was given to the David Lewis Northern Hospital. He was especially interested in dietetics, and his diabetic clinic, founded in 1922, was the largest in the district and kept outstanding records. He followed closely the work of the dietitians and the diet kitchen, and he took the leading part in producing the *David Lewis Northern Hospital Diet Book*, first published in 1935. He was the first director of the hospital's biochemical laboratory. He was elected F.R.C.P. in 1941. He retired from the hospital staff last year.

A colleague writes: "Pemberton was an outstanding teacher and there was always great competition among the undergraduates to be appointed to him as clinical clerks. The meetings of all the members of the medical staff of the hospital over which he presided every week provided a very great stimulus to his colleagues and were a constant source of lively discussion. His publications were chiefly concerned with diabetes and diseases of the peripheral vascular system, but he brought original and stimulating criticism to papers by his junior colleagues on a wide variety of subjects."

Dr. Pemberton leaves a widow and a daughter.

JAMES MEADOWCROFT TURNER

M.B. Lond., F.R.C.S.

Mr. J. M. Turner, consulting orthopædic surgeon to Brighton Municipal Hospital and orthopædic surgeon to the Royal Sussex County Hospital, died on Jan. 6 at the age of 52.

He was born at Oldham and took his medical training at Guy's Hospital, qualifying in 1920 and taking his M.B. with honours and distinction in surgery in the following year. After holding house-appointments at Guy's he was for a time in general practice in Streatham; but his interest in orthopædics had already been aroused by his work under Trethowan and Lambrinudi, and after holding a clinical assistantship in the orthopædic department at Guy's he became surgical registrar at the Royal National Orthopædic Hospital. He took the F.R.C.S. in 1928. In the early '30s he settled in Brighton and quickly established a large consulting practice. During the late war he served in Persia with the R.A.M.C. as an orthopædic specialist, holding the rank of major.

R. B. writes: "By nature Turner was shy and retiring, and it was only rarely that he could be persuaded to contribute to the medical journals. As an operating surgeon he was conservative, and he preferred to confine his work to the more simple and straightforward cases, but when occasion arose he tackled an exacting and difficult problem with certainty and skill. In obscure cases his opinion was invaluable. Those who knew him came to depend on his quiet sympathy and surgical skill."

WILLIAM HAROLD ROWE JEREMY

M.B. Camb., D.O.M.S.

Mr. Jeremy, ophthalmic surgeon to the West of England Eye Infirmary, died at his home at Pinhoe, near Exeter, on Dec. 27 at the age of 46. He was the only son of the late Harold Rowe Jeremy, ophthalmic surgeon to the London Hospital.

William Jeremy studied medicine at Cambridge and St. Bartholomew's Hospital, and after graduating M.B. he became ophthalmic house-surgeon at Barts and later house-surgeon at the Royal Westminster Ophthalmic Hospital. During the late war he served as an ophthalmic specialist with the rank of squadron-leader in the R.A.F.V.R. In 1943 he took the D.O.M.S. In 1946 he was appointed assistant surgeon to the West of England Eye Infirmary, Exeter, becoming surgeon two years later. He was also ophthalmic surgeon to the North Devon Infirmary, Barnstaple, and to the West of England Institution for the Blind in Exeter.

M. D. B. writes: "Jeremy was always a most conscientious and competent oculist, and soon acquired a flourishing private practice. He was at his best in his outpatient work and in the operating-theatre. Refractions he endured but never enjoyed, relishing them even less than most ophthalmic surgeons. Particularly in his earlier years at Exeter he was keen to try new operations, but in the end he as often as not fell back on old and well-tried methods. His patients liked him, and he was essentially friendly and kind-hearted: if he had a fault it was that he was too kind and found it difficult if ever he had to break bad news to a patient.

"He was a perfect colleague, and my affection for him grew with the years. Absolutely loyal, of a genial temper, and with a happy sense of humour, he would have been an asset to the staff of any hospital. It is hard to believe that there will be no more of those pleasant breaks on Monday mornings when we three surgeons forgathered for coffee, not really for the sake of the coffee but for the pleasure of being together and of talking about anything or nothing—about a difficult case (and none of us was ashamed to admit before the others that we didn't know the answer), about our patients (William always seemed to have the most extraordinary ones), about infirmary problems and difficulties, or possibly a little scandal, if only we could hear of any. Or there were the occasional evenings in Southernhay when he came for a drink, with the inevitable attaché case, and, like Heraclitus, we 'tired the sun with talking and sent him down the sky' until dinner could be kept waiting not a moment longer and William was gonged out."

Mr. Jeremy leaves a widow and three young children.

OSCAR HILTON

B.A., D.M. Oxfd

Dr. Hilton, who was for many years in practice at Northwood, Middlesex, died on Jan. 8, at the age of 79. He was born in Dundee but was educated in London at St. Paul's School. He was an exhibitioner of Magdalen College, Oxford, and after taking his B.A. with first-class honours in physiology in 1899 he went to St. Thomas's Hospital to complete his medical studies. He qualified in 1902, and held house-appointments at St. Thomas's and at Great Ormond Street, where he fell under the spell of the late Sir Frederic Still. He also held a post at the Children's Hospital, Shadwell, before he settled in general practice on the edge of the Chilterns at Northwood, then a small village. With the years Northwood became a large urban area, and his practice grew and prospered. He was one of the founders of the Northwood and Pinner Hospital. His experience in general practice led him to publish a monograph on the commoner children's diseases, which carried a foreword from Sir Frederic Still. He retired to Dorset in 1947.

"Outside his happy family circle," writes W. R., "Hilton's two greatest loves were children and his garden. Children could not resist him, nor he them. This, combined with his exceptional knowledge of children's diseases, and his broad common sense, were the basis of his success. Like all men of character he could sometimes fail. He had a short and brusque way on the telephone which occasionally scared away even his friends, but those who knew him loved and forgave this very pardonable fault. He will be remembered always with affection and gratitude."

D. M. B., who took over his practice, describes Hilton as "a man of great humanity and charm and endowed with unusual clinical judgment. While intolerant of fools and of those who thought themselves much more ill than they really were, to those in trouble or severe illness he gave all his skill and kindness and wise counsel. His memory was prodigious, and up to the last there were few details in the family histories of his Northwood patients which he could not recall. I used to send him bulletins every three or four months, in which he seemed to delight, and the letters he wrote in answer were full of wisdom and humour."

Dr. Hilton leaves a widow, three sons, and a daughter.

Professor LERICHE

Mr. David Patey writes:

May I add a note to your excellent obituary notice on Professor René Leriche to mention the great influence on Leriche of Halsted, an influence probably secondary only to that of Claude Bernard. Leriche never seemed to tire of acknowledging this indebtedness as illustrated for example by the famous obituary notice he wrote on Halsted's death, the numerous references in his book *La philosophie de la chirurgie*, and his oration at the Halsted centenary celebrations in Baltimore in 1952. At his first visit to Baltimore as a young man, Leriche was captivated not only by Halsted's contribution to surgical technique in his doctrine of gentleness in the handling of tissues, but also by his surgical philosophy in regarding surgery as a branch of experimental biology.

On Leriche's oratory and writing, the charm of which all acknowledge, I once took the opportunity of asking him which French writer had most influenced him. I hazarded the guess that it was Flaubert, who was noted for the extreme care with which he polished and repolished every word and sentence, but Leriche told me that this was not so. In fact he found Flaubert rather tedious and he said that the writer who had had the greatest influence on him had been Anatole France.

Perhaps you will have space for a final characteristic little story. When I was introduced to Leriche at Baltimore in 1952 it was mentioned that we had met at the International Society of Surgeons meeting in Paris in 1951, of which Leriche was president. I diffidently added that he would not remember me as I had been just a "simple soldat" while he was the "général." Straight away Leriche replied "Il vaut mieux être simple soldat et jeune, que général et vieux." And at once he proceeded to put me at ease with graciousness and charm.

Notes and News

HAROLD HILL HEALTH CENTRE

BETWEEN 1948 and 1954 a community of thirty thousand people was created at Harold Hill, in Essex, as part of the dispersal plan for the population of Greater London. This new population brought with it a need for medical care, and a report by the professional committee of the Harold Hill Health Centre describes steps taken to meet it.

In the early stages new practices were declared by the executive council and special doctors' houses with attached surgeries were built, but during early 1954 a health centre was completed. This centre was originally intended to accommodate four practitioners, either singly or in partnership, as well as the personal health services and dental services provided by the local authority, with certain clinics run by the North East Metropolitan Regional Hospital Board.

After preliminary discussion with all the doctors who had care of patients on the estate, nine doctors (two in partnership) accepted invitations to lease the general-practitioner accommodation, and a rota system was devised whereby each had the use of a suite—waiting-room, consulting-room, and examination-room—for five sessions a week. These practitioners share the services of a trained nurse and of the secretarial staff of the centre, and the report notes that, despite acknowledged differences of temperament between the doctors, coöperation has been perfect and no disagreements of importance have arisen during the first year's work.

The doctors attending the centre retain their own surgery premises, but are provided with filing cabinets for the medical records of those patients who attend regularly at the centre. Attendances at the centre have hitherto been smaller than those at the doctors' own surgeries, but greater familiarity with the centre may reverse this. The centre will certainly play an increasing part in health education in the locality, for it is designed for a waiting-room and an adjacent clinic room to be thrown together as a lecture-hall. Patients attending the centre will see their own doctor working side by side with clinic medical officers, while contact between the doctors and nursing staff is encouraged by a shared staff room. This direct contact must surely improve the standard of health care in the community, and it should encourage direct case-work by the practitioner/health-visitor team. In this respect it is an advantage that more practices than the four originally intended are brought into close touch with the local health authority.

A SURGICAL CAUTERY

Mr. J. E. Richardson, of the London Hospital, informs us that he has had good results with a variety of cautery originally made to the specifications of Mr. W. Calvert, M.R.C.O.G., and now manufactured in this country, with blades of various shapes and weights. He has used it to cut stomach and small and large intestine, and finds that with practice the heat can be adjusted to cut down to the blood-vessels, which can then be dealt with individually. It operates on approximately 12 volts (A.C. or D.C.) by means of a miniature element situated at the end of the shaft. As the heating element is totally enclosed there is no risk of fire or accidental burning.

The 'Oryx-Calvert' cautery is made by Oryx Electrical Laboratories at Brighton, and is distributed by Antex, 3, Tower Hill, London, E.C.3.

University of Manchester

On March 23, at 5 P.M., Lady Violet Bonham Carter, D.B.E., will give the Lloyd Roberts lecture. Her subject will be Of Human Greatness.

University of Glasgow

On Jan. 14 the following degrees were conferred:

M.D.—Thomas Jack, A. C. Kennedy (with high commendation); J. A. Ritchie, P. M. Shepherd (with commendation); D. M. Kissen (with honours); A. J. M. Campbell, * James Carswell.

Ch.M.—L. S. Scott (with commendation).

Ph.D.—J. S. Gillespie, Ann B. McNaught.

M.B., Ch.B.—Ian Airlie, W. D. Balfour, T. J. Coady, B. H. G. Collie, Charles Diamond, Emmanuel Doe-Doosey, H. P. Doig, G. R. Dow, Nathaniel Fell, Max Gold, R. D. Gray, W. S. Livingston, J. E. Lunn, A. W. McCracken, C. D. McCusker, J. W. McIntosh, N. D. MacRorie, J. M. Martin, J. P. Mellon, Margaret Montgomery, J. L. Morrison, Jean B. Owens, Christine Pattie, A. J. Peters, A. R. Robertson, D. S. Ross, J. H. Smith, J. H. Stewart, R. M. Todd, J. C. Waugh.

* In absentia.

University of Bristol

The dissertation of Dr. Suzanne Clarke for the degree of M.D. has been approved.

Royal College of Surgeons of England

A meeting of the council held on Jan. 12, with Sir Harry Platt, the president, in the chair. The fellowship was granted to Vasudevrao Govindrao Diwanker and the membership to J. D. Atwell. Diplomas were also awarded, jointly with the Royal College of Physicians, to the following:

D.L.O.—J. A. F. Bouloux, Philip Cole, E. I. P. Ebosie, Kamalakar Chintaman Gadre, Israr Hasan Jafri, David Lyen, C. L. T. McClintock, Achyutananda Sinha, Patricia Tellesson, T. J. Thwaite, G. C. W. M. Wallis, Percy Winston.

D.Path.—E. G. Gordon, C. K. Heffernan, J. G. Hoult, R. C. Jennings, H. W. MacIntyre, S. G. Waller, H. J. Woodliff.

D.P.M.—R. M. Bowman, R. F. Caddell, Daphne C. Collins, P. J. Crowley, T. E. Grant, W. O. Heffernan, J. M. Hughes, F. D. Kelsey, W. M. M. Lyon, B. F. MacCarthy, Austin McCawley, Joan McConnell, Balbir Singh Mancoha, Margaret E. Morgan, Jagatbandhu Mukerjee, Dayanand Naidoo, H. M. Park, H. S. Paull, J. D. Pollitt, A. B. Samaraweera, Tisse Appuhamilage Chandrapala Siriwardena, J. M. A. C. Stewart, J. D. Sullivan, P. G. Woolf.

D.T.M. & H.—Abul Khayer Muhammad Nawab Ali, J. M. Bolton, W. E. Clifford, H. S. Moore, Kersasp Rustomji Patel, A. M. Robertson, Mohammad Shafi, Mansoor Moulabukhsh Soomro, Somrouy Tongsopit.

D.M.R.D.—Ajit Kumar Bhattacharyya, J. H. G. Brodribb, J. W. Cowie, Sumant Gaurishanker Daftary, Bimal Kumar Dey, R. E. Eban, Kathleen A. Elliott, K. T. Evans, L. A. Gillanders, John Hamill, J. A. B. Harrison, R. G. Hirons, P. J. Hurley, James Kalokerinos, Fun Yong Khoo, H. E. Knowles, R. F. C. McDowell, B. D. McKee, F. A. F. Mackenzie, W. E. Magnus, J. P. Murray, P. N. Newsam, W. J. Payne, S. W. Shellshear, J. N. Sidhva, Sybil S. Stein, H. J. J. Van Heerden, L. R. Whittaker, M. J. Wright.

D.A.—D. H. Alltree, Frances J. Baker, John Barker, Bhagwan D. Belani, M. H. Berk, P. H. Beves, G. J. Bigley, Cecil Bishop, C. G. Blakeley, D. E. Borg, I. M. Brown, Margaret E. Burns, C. M. Campbell, Mary D. Campbell, Antonio Canellas, Maurice Chait, Paritosh Chaudhuri, D. I. Chisholm, G. E. Chorley, A. J. Cilliers, Gordon Clarke, Mary J. Clifford, W. H. Cochrane, P. A. Coldrey, Patrick Coleman, Barbara P. Coppen, Elizabeth P. Cracroft, T. J. Crowley, Ouida M. S. d'Abreu, S. H. Dallas, T. D. W. Davies, E. J. Delaney, M. J. Diamond, J. C. Dick, Mary A. Elsdale, Ellie Eting, N. H. Eve, Nancy L. Ferguson, Isabel M. Forster, Denise I. Foulkes, Henry Frank, Katharine M. R. Franklin, A. S. Gardiner, Jean O. Gerrard, Rustum Yusuf Gool, J. L. Hadley, M. H. Heyns, J. M. Hiddleston, K. B. Holloway, Agnes C. Howie, Ruth R. Irvine, Mervyn Jeffries, Christina M. Jones, J. D. Kelly, J. H. Kerr, Louis Khan, Pamela D. Kilner, R. S. Lambie, Laurence Langdon-Herring, Veronica R. E. Lethbridge, Mendel Levitt, I. A. Levy, R. B. Lewis, D. T. Lovell, D. F. Lunn, T. M. McAneny, Rhoda G. McCall, John MacDermott, I. R. McDonald, Shirley M. McLean, D. A. H. McNaught, W. M. Martin, W. D. Meldrum, J. F. Meynell, Marguerite Midgley, Peter Milne, T. N. Munro, A. L. Nathan, Joan M. Newton, Anne Nunan, J. G. O'Mahony, Pamela M. Ordish, Sidney Owitz, Olive J. Paine, G. R. C. Palmer, Freda M. E. Parker, Odile M. E. P. Plantevin, Venugopal Ramachandra, K. W. Robinson, R. A. Rollison, G. M. Ross, Gwyn Rowlands, Isobel B. A. Shivas, Louis Shubitz, Bijoy Kumar Sil, J. L. Simcock, Radha Sitaram, P. C. Smart, S. E. Smith, Vivian Stanhill, W. G. Staples, C. J. Stephens, Helen L. S. Tennent, Jack Walker, R. S. Walsh, R. A. J. Williams, F. R. H. Wrigley, N. L. Wulfsohn, W. G. Wurth, M. B. Yorston.

Medical Research Council

The council invite applications for the following fellowships for 1956–57:

Rockefeller Travelling Fellowships.—These fellowships are intended for graduates resident in this country who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad, before taking up positions for higher teaching or research in the United Kingdom. Fellowships tenable in the United States will normally carry a maintenance allowance at the rate of $2700 per annum for a single fellow and $3900 per annum for a married fellow. Provision will also be made for travelling and other approved expenses.

Eli Lilly and Lederle Travelling Fellowships.—These fellowships, tenable in the United States, are offered on terms and conditions similar to those attaching to the Rockefeller fellowships.

Dorothy Temple Cross Fellowships in Tuberculosis.—These fellowships offer special opportunities for study or research to British doctors who intend "to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis." The Fellowships will, as a rule, be awarded to candidates who wish to make their studies or inquiries elsewhere than in the United Kingdom. They provide for the payment of a maintenance allowance at the rate of £650 per annum for a single fellow and £900 per annum for a married fellow. An allowance will be made for travelling and other approved expenses.

Alexander Pigott Wernher Fellowships in Ophthalmology and Otology.—These fellowships are intended for doctors who are likely to profit by a period of work in ophthalmology or otology at a centre abroad before taking up positions for higher teaching and research in these branches of medical science. The awards will normally be tenable for one year. The fellowships provide for the payment of a maintenance allowance at the rate of £650 per annum for a single fellow or £900 per annum for a married fellow. An allowance will be made for travelling and other approved expenses.

Forms of application may be had from the secretary of the council, 38, Old Queen Street, London, S.W.1, with whom applications must be lodged by March 15 (March 31 for the Pigott Wernher fellowships).

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Jan. 9, with Prof. Stanley Graham, the president, in the chair, the following were admitted fellows of faculty:

Ali Muhammad Nasim-Almaiy, William Brodie, W. D. Roberts.

College of General Practitioners

Butterworth Gold Medal.—The subject for this year's essay is the Care of the Elderly in General Practice. Essays should be sent, not later than Sept. 17, to the chairman of the awards committee of the college, 14, Black Friars Lane, London, E.C.4, from whom further particulars may be had.

Central Middlesex Group H.M.C.

Dr. Peter Friedlander has been awarded a prize of £50 from the research fund of this group for his thesis on the physiological response of the stomach to fat in duodenal ulcer. The work of Dr. J. S. Crawford on obstetrical anæsthesia was commended.

Microcirculatory Conference

The theme of the third Microcirculatory Conference, which is to be held on April 3, at Milwaukee, Wisconsin, will be regulation of blood-flow. Further information may be had from the chairman, Mr. George P. Fulton, PH.D., department of biology, Boston University, 675, Commonwealth Avenue, Boston 15, Massachusetts.

Child and Family Psychiatry

The department of child psychiatry of the Ipswich Group Hospitals is holding a refresher course on this subject from April 9 to 13. Further information may be had from 11, Fore Street, Ipswich.

Oliver Prize

The 1955 award of this prize (£50) has been made to Dr. W. d'A. Maycock for his contributions to the development of blood-transfusion.

Liverpool University Medical Students Society

The annual dinner for past and present members of this society is to be held at the Adelphi Hotel, Liverpool, on Feb. 8, when the guest of honour will be Sir Clement Price Thomas. Tickets (25*s.*) may be had from the medical dinner secretary, Medical School, University, Liverpool, 3.

Eli Lilly Medical Research Fellowship

Applications are invited before April 30 from doctors registered in South Africa for this fellowship for medical research in the United States. The value of the fellowship is $250 a month for twelve months, with return travelling expenses. Further particulars can be had from Dr. H. A. Shapiro, P.O. Box 1010, Johannesburg.

Society of Chemical Industry

On Wednesday, Jan. 25, at 6.30 P.M., the third meeting in the series on Nutritional Requirements and Food Fortification will be held at Burlington House, Piccadilly, London, W.1. The speakers will be Miss E. M. Widdowson, D.SC., and Miss D. L. Hollingsworth, and the subject will be Calcium and Iron.

Salon des Médecins

An art exhibition for doctors, dentists, pharmacists, and veterinary surgeons will be held from March 4 to 25 at the Musée d'Art Moderne, Paris. British doctors are invited to send details of name, address, qualifications, and titles of exhibits to Dr. Malet, 67, Avenue Pierre-Larousse, Malakoff (Seine), France, without delay. Exhibits should bear the same information and should be sent to Messrs. Davies Turner, Ltd., 47, Graham Terrace, London, S.W.1, and not direct to Paris.

A newspaper report on the use of 2-phenyl-3-methyl-tetrahydro-1, 4-oxazine hydrochloride as a slimming pill says that the medical advisers of the firm (Messrs. Pfizer) which has introduced it are satisfied that it is "safe enough to be sold over the chemists' counter." Dr. R. K. Phillips informs us that "the advice of myself and of my medical colleagues and that of the firm has always been that the drug should be taken only under medical supervision."

Directory of Convalescent Homes.—King Edward's Hospital Fund have published the 1956 edition of their directory of homes serving Greater London. Copies may be had from the Fund, 10, Old Jewry, E.C.2. (7*s.* 6*d.* post free.)

Diary of the Week

JAN. 22 TO 28

Monday, 23rd

MANCHESTER MEDICAL SOCIETY
9 P.M. (Medical School, University of Manchester). *General Practice.* Dr. J. Blair Hartley: The Radiologist and the General Practitioner.

Tuesday, 24th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine.* Prof. Andrew Wilson, Dr. Sidney Locket, Dr. Denis Williams, Dr. R. M. Mason: Recent Advances in Treatment.
ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Mr. V. B. Green-Armytage: The Dramatic in Obstetrics and Gynæcology.
INSTITUTE OF DERMATOLOGY, Lisle Street, London, W.C.2
5.30 P.M. Dr. R. H. Meara: Bullous Diseases.

Wednesday, 25th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Endocrinology.* Prof. Melville Arnott, Dr. A. C. Crooke, Mr. H. Donovan, Prof. S. H. Taylor: Total Adrenalectomy for Hypertension.
INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. F. H. Young: Management of the Tuberculosis Patient after leaving Hospital.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Clefts, Vesicles, and Bullæ.
BRITISH PSYCHOLOGICAL SOCIETY
8.30 P.M. (1, Wimpole Street, W.1.) *Medical Section.* Prof. T. Ferguson Rodger: The Other Man's Point of View.
BIRMINGHAM MEDICAL INSTITUTE, 154, Gt. Charles Street, Birmingham 3
8 P.M. Dr. C. L. C. Burns: Experience and Reflection.
NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY, 64, St. James's Street, Nottingham
8.30 P.M. Prof. R. E. Tunbridge: Disorders of the Biliary Tract.
MANCHESTER MEDICAL SOCIETY
4.30 P.M. *Pathology.* Dr. Lois Stent: Some Aspects of Clinical Pathology. (Presidential address.)
ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow, C.2
5 P.M. Prof. D. F. Cappell: The Kidney in Hypertension.

Thursday, 26th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. B. B. Milstein: Cardiac Arrest and Resuscitation. (Hunterian lecture.)
UNIVERSITY OF LONDON
5.15 P.M. (University College Hospital Medical School, University Street, W.C.1.) Prof. Gordon King (Hong-Kong): Advanced Extra-uterine Pregnancy.
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Mr. D. S. Poole-Wilson, Mr. A. W. Badenoch: Urethral Injuries.
UNIVERSITY OF ST. ANDREWS
5 P.M. (Queen's College, Dundee.) Dr. H. J. Deuel (Los Angeles): Fat as an Essential Component of the Diet.

Friday, 27th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Pædiatrics.* Dr. Kenneth Cross, Mr. J. B. Blaikley, Dr. George Abercrombie: Asphyxia in the Newborn.
8.15 P.M. *Obstetrics and Gynæcology.* Miss Gertrude Dearnley, Mr. H. G. E. Arthure, Mr. D. B. Fraser: Place of Myomectomy in the Treatment of Primary Infertility.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. S. E. Birdsall: Chronic Otitis Media.
MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, W.1
7.30 P.M. Dr. A. Grimble: Prognosis of Cardiovascular Syphilis.

Appointments

DRUMMOND, JAMES, M.B. Edin., D.P.H.: deputy M.O.H. and principal school M.O., East Ham.
MANSON, W. G. C., M.B. Aberd.: appointed factory doctor, Alford, Aberdeen.

The Hospital for Sick Children, Great Ormond Street, London:

EILOART, MARY E., M.B. Lond., M.R.C.P.: part-time M.O., department of dermatology.
MYERS, N. A. A., M.B. Melb., F.R.C.S., F.R.A.C.S.: surgical registrar to the thoracic unit.
STROUD, C. E., M.B. Wales, M.R.C.P., D.C.H.: asst. medical registrar.

Births, Marriages, and Deaths

BIRTHS

KELSALL.—On Jan. 10, in London, the wife of Dr. A. R. Kelsall—a daughter.
MULCAHY.—On Dec. 8, at Hatch Street Nursing Home, Dublin, to Aileen (née Hanton), wife of Dr. R. Mulcahy, 58, Fitzwilliam Square, Dublin—a son, Richard Mary.

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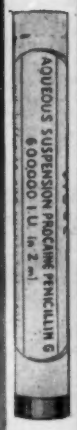

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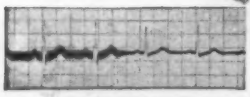

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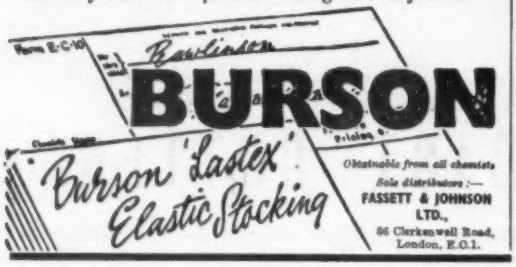

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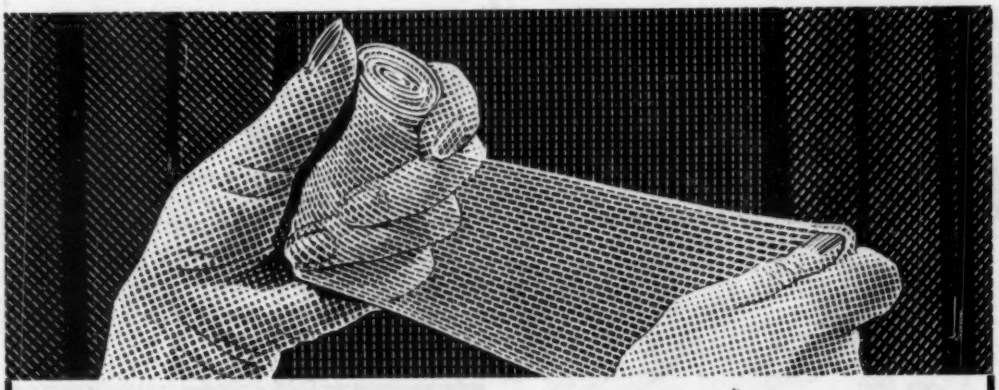

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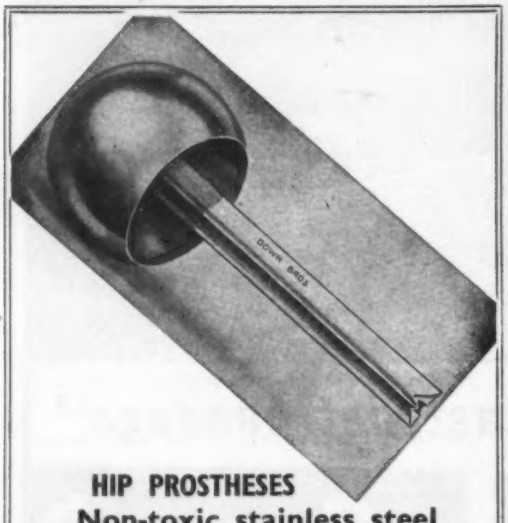

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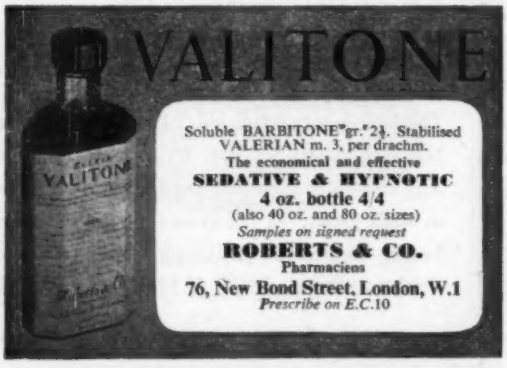

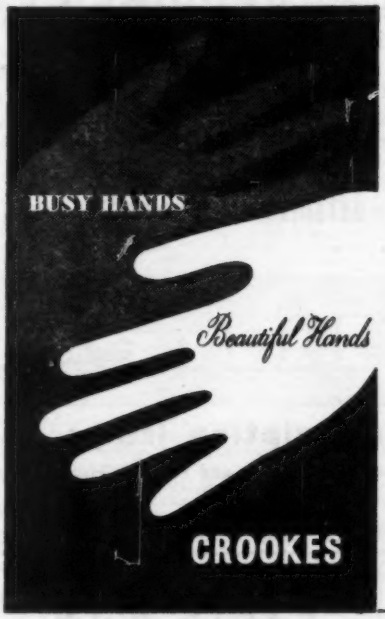

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies but candidates may normally visit the hospital by appointment.

Academic and Educational

UNIVERSITY OF LONDON

A LECTURE on "Advanced Extra-Uterine Pregnancy" will be given by Prof. GORDON KING (Hong Kong) at 5.15 P.M. on 26TH JANUARY at University College Hospital Medical School, University-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY COLLEGE LONDON (Gower-street, W.C.1)

Dr. A. NIZET (University of Liège) will give a PUBLIC LECTURE entitled "Hæmopoiesis and General Protein Metabolism" on MONDAY, 30TH JANUARY, at 5 P.M.

Admission free, without ticket.

E. A. L. GUETERBOCK, Secretary.

GRESHAM COLLEGE, Basinghall-street, London, E.C.2

Tel. MONarch 2433

4 LECTURES by Prof. J. L. D'SILVA, D.SC., M.R.C.P. (Gresham Professor in Physic) on "The Blood and the Transport of Oxygen." MONDAY–THURSDAY, 23RD–26TH JANUARY.

The Lectures are free and begin at 5.30 P.M.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

POSTGRADUATE ACADEMIC DIPLOMA IN BACTERIOLOGY

The COURSE for the Postgraduate Diploma in Bacteriology for the SESSION 1956–57 will commence in OCTOBER, 1956. This is a full-time day course extending over 1 academic year.

The course may be taken by :

(*a*) Graduates in Medicine or Veterinary Science desiring to study Bacteriology as applied to Medicine and Hygiene ;

(*b*) Graduates in Science with a First or Second Class Honours degree in Chemistry, or its equivalent. For such students, the course covers the fields of General Bacteriology, Chemical Microbiology, and Industrial Microbiology.

Applications for admission to the Diploma course must be received not later than 1st March, 1956.

Further information and application forms can be obtained from the Registrar, London School of Hygiene and Tropical Medicine, Keppel-street, W.C.1.

ROYAL SOCIETY AND NUFFIELD FOUNDATION COMMONWEALTH BURSARIES

Applications are invited for awards under the Royal Society and Nuffield Foundation Commonwealth Bursaries Scheme which was instituted to provide facilities for increasing the efficiency of scientists of proven worth by enabling them to pursue research, learn techniques or follow other forms of study in natural science in countries other than their own in the Commonwealth where the physical or personal environment or both are peculiarly favourable.

The bursaries provide travel, maintenance at a rate of about £600 a year depending on living costs and the applicant's circumstances and are tenable usually for periods of 2–12 months ; they are not intended to provide any salary as such. Bursars will not be permitted to prepare specifically for, or to take examinations for, higher degrees or diplomas.

For proposed visits beginning during the period from July to December, 1956, applications must be received complete with supporting documents not later than 15th March, 1956, by the Assistant Secretary, The Royal Society, Burlington House, London, W.1, from whom application forms and fuller particulars may be obtained.

THE NUFFIELD FOUNDATION

MEDICAL FELLOWSHIPS

As part of its programme for the advancement of health, the Nuffield Foundation is prepared to award a number of Fellowships to highly qualified Men and Women of the United Kingdom, usually between the ages of 25 and 35, who wish to train further for teaching and research appointments in any branch of medicine.

Applications for awards in 1956 must be received not later than 1st May, 1956. The conditions of these Fellowships and the application forms are obtainable from the Director, The Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1.

L. FARRER-BROWN, Director of the Nuffield Foundation.

MENTAL HEALTH RESEARCH FUND. Applications are invited for 1 or more LEVERHULME RESEARCH FELLOWSHIPS from suitably qualified persons wishing to pursue full-time research work bearing on problems of mental health, whether in clinical psychiatry or in 1 of its supporting sciences. Applicants may apply for either a Junior Fellowship, in the range £700–£1200 p.a. (including superannuation), or a Senior Fellowship, in the range £1300–£2000 p.a. (including superannuation). The appointments are for 2–3 years in the first instance, renewable for a maximum of 1 year thereafter.

Further information from the Secretary, Mental Health Research Fund, 39, Queen Anne-street, London, W.1.

THE RESEARCH INSTITUTE OF THE HOSPITAL FOR SICK CHILDREN, TORONTO 2, CANADA. ASSISTANT VIROLOGIST. Applications now being considered from medical graduates (Male or Female) with some training in laboratory methods, and an interest in pædiatrics. Duties comprise research into ætiology and laboratory diagnosis of virus diseases of children with special reference to "poliomyelitis" ; tissue culture techniques are mainly employed. Work will be carried out in the Virus Research Department, under direction of the undersigned. Vacant October, 1956, at starting salary of $5500, non-resident. Preference for person prepared to stay for indefinite period ; otherwise, 2-year tenure essential.

Applications, mentioning referees, to be submitted (air-mail) to Dr. A. J. RHODES, Director, The Research Institute, The Hospital for Sick Children, Toronto, Canada.

THE RESEARCH INSTITUTE OF THE HOSPITAL FOR SICK CHILDREN, TORONTO 2, CANADA. RESEARCH FELLOWSHIP IN PÆDIATRIC NEUROLOGY. Applications invited from medical graduates (Male or Female) with some training in pædiatrics or neurology. Duties will consist chiefly of original investigation of convulsive disorders in young children by clinical and laboratory methods, under the direction of Dr. J. S. Prichard. Post vacant 1st August, 1956. Salary $5000. Preference given to applicant prepared to work for a 2-year period.

Applications, with names and addresses of 2 referees, to be submitted to Dr. A. J. RHODES, Director, The Research Institute, The Hospital for Sick Children, 555, University-avenue, Toronto, Canada, from whom further details can be obtained.

IMPERIAL CANCER RESEARCH FUND. Applications are invited for the post of RESEARCH BIOCHEMIST or CHEMIST to work at the Fund's laboratories at Mill Hill. Experience in the study of steroid metabolism would be an advantage. Salary scale £950–£50–£1250. The successful candidate would be placed on the scale at a point commensurate with his qualifications and experience and would be required to join the F.S.S.U. Further details may be obtained from Dr. JAMES CRAIGIE, Imperial Cancer Research Fund Laboratories, Burtonhole-lane, The Ridgeway, Mill Hill, N.W.7.

Applications should be submitted to the Secretary, Imperial Cancer Research Fund, Royal College of Surgeons, Lincoln's Inn-fields, London, W.C.2, by 21st February, 1956.

UNIVERSITY OF LONDON. The Senate invite applications for the READERSHIP IN CLINICAL NEUROLOGY tenable at the Institute of Neurology (salary within range £1900–£2400 a year).

Applications (10 copies) must be received not later than 29th February, 1956, by the Academic Registrar, University of London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF LONDON. The Senate invite applications for the CHAIR OF PHARMACEUTICS tenable at the School of Pharmacy (salary not less than £2100 a year).

Applications (10 copies) must be received not later than 27th February, 1956, by the Academic Registrar, University of London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF LONDON. Application is invited for the MARY SCHARLIEB RESEARCH STUDENTSHIP, of the value of £250, for 1 year in the first instance. The Studentship is open to Graduates of this University who are registered medical practitioners or possess qualifications which, in the opinion of the Senate, would enable them to undertake postgraduate medical research.

Application (on prescribed form) must reach the Secretary to the Scholarships Committee, University of London, Senate House, London, W.C.1 (from whom form and further particulars may be obtained), not later than 28th February, 1956.

THE UNIVERSITY OF MANCHESTER. There is a vacancy for a RADIOGRAPHER in the Department of Anatomy. In addition to radiographic experience, candidates should possess an interest in the application of X rays to biological research, and a knowledge of cine-radiographic and micro-radiographic techniques, although practical experience in these techniques is not essential. Salary within the scale £425–£515 p.a., and with membership of a superannuation scheme.

Applications, giving particulars of experience and qualifications, should be sent to the Professor of Anatomy, The University, Oxford-road, Manchester, 13, as soon as possible.

THE UNIVERSITY OF MANCHESTER. Applications are invited for the full-time post of SENIOR LECTURER IN PSYCHIATRY. Salary from £2000–£100–£2250 p.a. according to qualifications and experience. Duties to begin as soon as possible. The successful applicant will be required to work in the Department of Psychiatry in the Manchester Royal Infirmary, and the Board of Governors of the United Manchester Hospitals is prepared to negotiate an honorary contract as Consultant with the person appointed.

Applications should be sent not later than 20th February, 1956, to the Registrar, The University, Manchester, 13, from whom further particulars and forms of application may be obtained.

UNIVERSITY OF DUBLIN. TRINITY COLLEGE. Applications are invited from registered medical practitioners for positions as Full-time CLINICAL TUTORS, to assist the Clinical Professors in the organisation of clinical teaching in hospitals. The appointments will be for 2 years (with the possibility of renewal for 1 further year), and the salary (according to qualifications and experience) will be in the range £750–£1000.

Further particulars may be obtained from the Registrar, Trinity College, Dublin, who will receive applications until 18th February, 1956.

UNIVERSITY COLLEGE, Ibadan, Nigeria. Applications are invited for LECTURESHIP IN ANÆSTHETICS. Post carries honorary appointment as Assistant Anæsthetist to University College Hospital. Applicants should have F.F.A.R.C.S., wide experience all types of anæsthesia (including thoracic) and some teaching experience. Good opportunities for research. Salary on present clinical scale : £1500–£100–£2000 p.a. Point of entry determined by qualifications and experience. Child allowance £56 p.a. per child (maximum £150 p.a.) for children resident in Nigeria or £100 p.a. per child (maximum £300 p.a.) for children resident elsewhere. Part furnished accommodation at rent not exceeding 7.7% of salary. Passages paid for member of staff, wife, and up to 3 children under 11 years, on appointment, overseas leave and termination. F.S.S.U. Outfit allowance £60 on appointment.

Applications (10 copies), stating age, full qualifications and experience, and naming 3 referees, to be received by 27th February, 1956, by Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF DURHAM. Applications are invited for the CHAIR OF DENTAL PROSTHETICS, tenable at the Dental School, King's College, Newcastle upon Tyne, which will become vacant on 1st October, 1956. The Professor will hold an Honorary contract with the Board of Governors of the United Newcastle upon Tyne Hospitals.

Further particulars may be obtained from the undersigned with whom 15 copies of application should be lodged not later than 5th March. E. M. BETTENSON, Registrar.

University Office, 46, North-bailey, Durham.

Hospital Services : Senior Appointments

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) PSYCHIATRIST AND SUPERINTENDENT (whole-time), Consultant grade, Three Counties Hospital, Arlesey, Beds (1237 Beds). Duties will include outpatient clinics at the Luton and Dunstable Hospital and consultative visits to other hospitals in the Luton and Hitchin Group. Residence provided, for which rent will be charged.

Applications by 20th February, 1956.

(2) CONSULTANT GYNÆCOLOGIST (2 half-days a week. 1 of which must be Thursday morning), Willesden General Hospital, Harlesden-road, N.W.10 (127 Beds).

Applications by 23rd February, 1956.

Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ROYAL FREE HOSPITAL GROUP. Elizabeth Garrett ANDERSON HOSPITAL. Applications are invited from registered medical practitioners for the appointment of Locum GYNÆCOLOGICAL SURGEON (Consultant 2 sessions per week) for approximately 3 months.

Applications, with the names of 3 referees, should be sent as soon as possible to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1.

WHITTINGTON HOSPITAL, Highgate Hill, London, N.19. Locum Tenens ORTHOPÆDIC ASSISTANT SURGEON (Senior Hospital Medical Officer grade) required for 3 months. Must hold higher surgical qualification and have wide orthopædic experience, including the management of fractures.

Apply Medical Superintendent (Telephone : ARChway 3070).

BIRMINGHAM REGIONAL HOSPITAL BOARD.

Whole-time CONSULTANT RADIOLOGIST, Lichfield, Sutton Coldfield and Tamworth (7 notional half-days) and Birmingham (Dudley Road) (4 notional half-days) groups. Wide experience specialty/higher qualification required.

Shrewsbury Group

Part-time CONSULTANT NEUROLOGIST (1 notional half-day weekly). Considerable experience specialty essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 6th February, 1956.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT OPHTHALMIC SURGEONS (2) (8 notional half-days), Norfolk and Norwich Hospital Group. Main hospital Norfolk and Norwich (441 Beds). Wide experience and higher qualification essential.

Applications (8 copies), stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 6th February, 1956. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT PSYCHIATRIST AND DEPUTY MEDICAL SUPERINTENDENT (whole-time), Little Plumstead Mental Deficiency Group of hospitals. The Group (1000 Beds) maintains a large Outpatient Service in relation to Mental Deficiency and Child Guidance. Applicants must have D.P.M. and comprehensive experience of operation of M.D. acts and regulations. House available.

Applications (8 copies), stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 30th January, 1956. Candidates invited to visit hospitals by direct arrangement with Medical Superintendent.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time or maximum Part-time (if the latter, to devote substantially whole of time to duties) ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer) to the Blackpool and Fylde Hospital Centre (Victoria Hospital, Blackpool, 344 Beds ; Fleetwood Hospital; St. Annes-on-Sea War Memorial Hospital ; Lytham Hospital, &c.). Higher qualification in anæsthetics essential ; appointee will work under direction of the Consultant Group Anæsthetist and will be required to live in or near Blackpool.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 31st January, 1956.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of Full-time SENIOR HOSPITAL MEDICAL OFFICER (non-resident). Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications to be made on forms obtainable from the undersigned as soon as possible.

F. J. CABLE, Secretary to the Board of Governors.

NEWCASTLE REGIONAL HOSPITAL BOARD. South SHIELDS TUBERCULOSIS ADMINISTRATIVE AREA. Locum Tenens ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer), whole-time, for 6 weeks.

Applications, together with names and addresses of 3 referees (preferably), to Deputy Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, immediately.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-UPON-THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably experienced medical officers for the post of Locum Whole-time ASSISTANT ORTHOPÆDIC SURGEON (Senior Hospital Medical Officer grade). The appointment is for 15 days to cover a leave period before 31st March. Actual dates will be negotiated with the successful candidate to suit both parties. The post may be resident or non-resident by arrangement.

Applications to the Physician-Superintendent, with 2 recent testimonials, within 7 days.

OXFORD REGIONAL HOSPITAL BOARD. Assistant ANÆSTHETIST (whole-time), Senior Hospital Medical Officer grade, to the hospitals of the Northampton Hospital Management Committee. Applicants should hold a higher qualification in anæsthetics. The successful candidate will be required to live in or near Northampton General Hospital.

Applications (10 copies), stating age, qualifications, experience, and the names and addresses of 3 referees, should reach the Secretary, 43, Banbury-road, Oxford, by 25th February, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment of ANÆSTHETIST (Senior Hospital Medical Officer grade) for duty in the hospitals in the eastern half of the County of Fife, based on Kirkcaldy General Hospital. The appointment is subject to the terms and conditions of the National Health Service.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, 11, Drumsheugh-gardens, Edinburgh, 3, by 11th February, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT PSYCHIATRIST for duties mainly at the Lansdowne Clinic, 4, Royal-crescent, Glasgow, C.3 (including attendance at 1 or 2 evening sessions weekly). The duties also include up to 5 sessions weekly at Glasgow Royal Mental Hospital. Salary (at age 32 and over) on the scale £1500–£50–£1950. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Graylingwell Hospital, Chichester, Sussex, which has Departments of Research and Neurology, and to which are attached 3 active outpatient clinics. Candidates must possess D.P.M. and have wide experience in psychiatry.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 11th February, 1956. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Warlingham Park Hospital, Warlingham, Surrey, which serves the County Borough of Croydon. Candidates should have D.P.M., and experience of both inpatient and outpatient work, including child psychiatry, is desirable.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 11th February, 1956. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time (non-resident) ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for the Royal Earlswood Group of (M.D.) Hospitals (1000 Beds approximately). Duties principally at Forest Hospital, Horsham. Candidates should possess D.P.M. and preferably have some experience of child psychiatry. Successful candidate required to live within reasonable distance of Forest Hospital, Horsham.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, London, W.1, by 11th February, 1956. Applicants may visit hospitals by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Netherne Hospital, Coulsdon, Surrey. Candidates must possess the D.P.M. and have good psychiatric experience. Appointment includes duties at all hospitals in the Group.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 11th February, 1956. Applicants may visit hospitals by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Park Prewett Hospital, Basingstoke, Hants (1675 Beds including Mental Hospital Annexes). Candidates should have D.P.M. and good experience in the diagnosis and treatment of mental illness.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 11th February, 1956. Applicants may visit Hospital by local arrangement.

NEWCASTLE REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners with wide hospital general and administrative experience for the whole-time post of SENIOR ADMINISTRATIVE MEDICAL OFFICER to the Board which has become vacant owing to the death of Dr. W. G. Patterson. The officer appointed will be required to act as adviser to the Board on the planning, organisation and staffing of the hospital and specialist services of the Region, and will also carry out such other administrative and executive functions as the Board may assign to him. Salary £2650–£140 (5)–£3350. Whitley Council terms and conditions of service will apply.

Applications, stating qualifications and experience, together with the names of 3 referees, should be sent within 21 days of the appearance of this advertisement, to the Secretary of the Board at Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6.

Hospital Services : Junior Appointments

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. HOUSE SURGEON/CASUALTY OFFICER (combined post), resident. Vacant early February. House Officer grade, not pre-registration. Not recognised for F.R.C.S.

Apply Hospital Secretary enclosing copies of 2 recent testimonials.

BETHLEM ROYAL HOSPITAL AND THE MAUDSLEY HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR REGISTRAR (first year), commencing on 1st April, 1956, at the above Postgraduate Teaching Hospital, with which is associated the Institute of Psychiatry (University of London). Candidates should have a higher medical qualification, and experience in psychiatry is essential.

Applications, giving details of experience and the names of 2 referees, should be made within 1 week of the appearance of this advertisement. Application forms obtainable from K. J. JOHNSON, House Governor and Secretary, Maudsley Hospital, Denmark-hill, London, S.E.5.

BETHLEM ROYAL HOSPITAL AND THE MAUDSLEY HOSPITAL. Applications are invited from registered medical practitioners for the appointment of REGISTRAR, commencing on 1st April, 1956, at the above Postgraduate Teaching Hospital, with which is associated the Institute of Psychiatry (University of London). Candidates with experience in general medicine and neurology or in psychology will receive special consideration.

Applications, giving details of experience and the names of 2 referees, should be made within 1 week of the appearance of this advertisement. Application forms obtainable from K. J. JOHNSON, House Governor and Secretary, Maudsley Hospital, Denmark-hill, London, S.E.5.

BETHLEM ROYAL HOSPITAL AND THE MAUDSLEY HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER, commencing on 1st April, 1956, at the above Postgraduate Teaching Hospital, with which is associated the Institute of Psychiatry (University of London). Applicants should intend to take a full training in psychiatry. Experience in general medicine and neurology or in the basic sciences is an advantage.

Applications, giving details of experience and the names of 2 referees, should be made within 1 week of the appearance of this advertisement. Application forms obtainable from K. J. JOHNSON, House Governor and Secretary, Maudsley Hospital, Denmark-hill, London, S.E.5.

BROMPTON HOSPITAL, S.W.3. Applications are invited for the following posts :—

ASSISTANT RESIDENT MEDICAL OFFICER (Senior House Officer grade). Appointment is for 6 months from 1st April, 1956. Experience in artificial pneumothorax essential and in E.N.T. work desirable. Duties include work in tuberculosis dispensary and wards.

NON-RESIDENT HOUSE PHYSICIAN for which there are 3 vacancies, for 6 months from 1st April, 1956. Duties include work in outpatient departments and wards, also 1 months duty at Frimley as occasion demands. Salary at the rate of £525 p.a.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 4th February, to KENNETH A. F. MILES, House Governor.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of CASUALTY OFFICER AND DEPUTY RESIDENT SURGICAL OFFICER (graded as Senior House Officer), vacant 5th February, 1956. Recognised for F.R.C.S. Salary £745 p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. HOUSE SURGEON (pre-registration) required on 16th February.

Applications, stating age, nationality, qualifications and experience with the names of 3 recent referees, should be sent to the Secretary not later than 4th February.

EASTERN HOSPITAL (Fevers), London, E.9. Registered RESIDENT HOUSE OFFICER. Duties may include some work in Chest Unit. Facilities for postgraduate study for higher qualifications.

Applications to Group Secretary, Hackney Hospital, London, E.9, by 28th January, quoting EH/HO.

GERMAN HOSPITAL, London, E.8. (General—157 Beds.) Applications are invited from registered medical practitioners for the 6 months appointment, vacant 8th February, of HOUSE SURGEON (obstetrics and gynæcology), and should be sent immediately to the Group Secretary, Hackney Hospital, E.9, quoting GH/HSO.

FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for appointment at above Hospital as MEDICAL REGISTRAR. Post vacant 1st April, 1956. Candidates may visit the Hospital by arrangement with Hospital Secretary.

Applications (5 copies to be completed) by 3rd February, 1956, on forms obtainable from Group Secretary (L6), 5, Collingham-gardens, London, S.W.5.

GROUP LABORATORIES OF GREENWICH AND DEPTFORD AND SEAMEN'S GROUPS. PATHOLOGICAL SENIOR HOUSE OFFICER, vacancy 1st March in above Laboratories. Post recognised for D.Path. of Conjoint Board.

Applications, stating age, qualifications and experience, with names of 2 referees, on or before 1st February to Group Secretary, Seamen's Hospital, Greenwich, S.E.10.

HAMMERSMITH HOSPITAL AND INSTITUTE OF CHILD HEALTH, Ducane-road, London, W.12. RESIDENT HOUSE PHYSICIAN (pædiatrics) required 1st April. Post recognised for D.C.H.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 4th February.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. SENIOR HOUSE OFFICER (resident), for Tuberculosis Unit (100 Beds).

Applications, with copies of 3 testimonials, to Hospital Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON required, duties mainly orthopædic, with some E.N.T., casualty, and emergency general surgery. New operating theatre, Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials, to Hospital Secretary.

LAMBETH HOSPITAL, Brook-drive, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the appointment of HOUSE SURGEON vacant on 11th February, 1956. The appointment is for 6 months and is recognised for the F.R.C.S.

Forms of application from the Physician-Superintendent.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. 2 vacancies occur 1st April, 1956, for RESIDENT HOUSE PHYSICIAN. Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and posts graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic as well as in wards.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 21st February.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

MOTHERS' HOSPITAL (Salvation Army), London, E.5. (Maternity—110 Beds.) OBSTETRIC HOUSE SURGEONS required as under :—

(*a*) from 1st March (pre-registration) ;

(*b*) from 1st March (registered).

The 6-months appointments are recognised for the M.R.C.O.G.

Apply Group Secretary, Hackney Hospital, London, E.9, quoting MH/HO.

NEASDEN HOSPITAL, Brentfield-road, Neasden, N.W.10. Whole-time MEDICAL REGISTRAR (resident) required at Neasden Hospital (Infectious Diseases), for 1 year in the first instance, renewable. Experience in infectious diseases and children's diseases an advantage. Post vacant 26th April, 1956. The Hospital is a Regional Centre for poliomyelitis, and there are facilities for postgraduate studies. The Hospital may be visited by appointment with the Physician-Superintendent.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 6th February, 1956.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. HOUSE SURGEON (resident). Approved pre-registration post. Vacant 14th February.

Applications, stating age, qualifications, &c., with the names and addresses of 2 referees, should be sent to the Secretary at above address.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. 2 RESIDENT HOUSE PHYSICIANS required for 1st March, for 6 months. General medicine. Approved as pre-registration posts (first or second).

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 30th January.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. HOUSE SURGEON (resident), required for 1st March, for 6 months. General, orthopædic and traumatic surgery. Approved as pre-registration post (first or second). Recognised for training for F.R.C.S.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 30th January.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Locum REGISTRAR in Medicine (general), required for 30th January. Higher qualification in medicine desirable. Non-resident, but required to sleep in on full duty nights (7 in 21).

Applications to Secretary of Hospital.

PUTNEY HOSPITAL, Lower Common, London, S.W.15. HOUSE SURGEON (resident), vacant 20th February, 1956. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 1st February, 1956.

PLAISTOW HOSPITAL, Samson-street, London, E.13. (185 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (post-registration or pre-registration second post) for 6 months commencing early February, in the Chest Unit and Infectious Diseases Unit. Some experience in diseases of the chest desirable. The position offers good opportunities for experience in general medicine.

Applications, with copies of recent testimonials, to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 25th January, 1956.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London E.15.

HOUSE PHYSICIAN (pre-registration).
HOUSE SURGEON (pre-registration).
JUNIOR CASUALTY OFFICER (third post).

All these posts are for 6 months commencing 13th February, 1956.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 28th January, 1956.

ROYAL EYE HOSPITAL. King's College Hospital Group. Applications are invited for the post of SENIOR HOUSE OFFICER, vacant from 1st April, 1956.

Applications, together with copies of recent testimonials, should be made to the Secretary, The Royal Eye Hospital, St. George's-circus, S.E.1. as soon as possible.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of SENIOR RESIDENT ANÆSTHETIST. Applicants must be registered medical practitioners of not more than 10 years standing. The appointment is for 6 months from 1st April, 1956, with duties at the North Western Branch and Hampstead General Hospital. Salary in accordance with the Ministry of Health scale for Senior House Officers.

Application forms may be obtained from the Secretary, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 1st February, 1956.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of JUNIOR RESIDENT ANÆSTHETIST. Applicants must be registered medical practitioners of not more than 10 years standing. The appointment is for 6 months, duties to commence on 1st April, 1956. Salary in accordance with the Ministry of Health scale for House Officers.

Application forms may be obtained from the Secretary, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 1st February 1956.

ROYAL FREE HOSPITAL GROUP. Applications are invited from registered medical practitioners for the post of SENIOR CASUALTY OFFICER at The Royal Free Hospital. The appointment is full time, resident for 6 months. Duties to commence 1st April, 1956. Salary and conditions of service in accordance with those laid down by the Ministry of Health for Senior House Officers.

Application forms may be obtained from the Secretary, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 1st February, 1956.

ROYAL FREE HOSPITAL. Applications are invited for the post of FIRST ASSISTANT (Senior Registrar grade), to the Department of Cardiology at the Royal Free Hospital. Applicants must be registered general medical practitioners of not more than 10 years qualification, and have held a post as Senior Registrar in Medicine for a period of 4 years. Membership of the Royal College of Physicians is essential. The appointment is full-time, non-resident, and for 1 year in the first instance, duties to commence on 1st May, 1956. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Formal application, giving names of 3 referees, should be made to the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, before 1st March, 1956.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of ORTHOPÆDIC REGISTRAR (full-time) non-resident. Preference will be given to candidates with a higher surgical qualification. Duties to commence on 12th April.

Applications to be received not later than 11th February. Forms of application can be obtained from the House Governor at 234, Great Portland-street, London, W.1.

ST. ANDREW'S HOSPITAL, Bow, E.3. Applications are invited for the post of HOUSE PHYSICIAN (recognised pre-registration post) vacant on 15th February. Post is tenable for 6 months.

Applications, stating age and qualifications with copies of at least 1 testimonial, should be sent immediately to the Medical Superintendent, St. Andrew's Hospital, Bow, E.3.

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum REGISTRAR (anæsthetics) required 20th February–18th March.

Applications, giving full details, and names of 2 referees, to Group Secretary at above address.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Lisle-street, Leicester-square, London, W.C.2. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER for the Inpatient Department, vacant 1st April, 1956.

Inquiries and applications, with the names of 2 referees, by 11th February, 1956, to the Secretary to the Board of Governors.

ST. THOMAS'S HOSPITAL, London, S.E.1. Resident REGISTRAR to the Department of Anæsthetics, for a period of 1 year in the first instance from 22nd May, 1956.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 18th February, 1956.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, E.13. HOUSE SURGEON (pre-registration) to commence 5th March, 1956.

Apply to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 28th January, 1956.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners, for the post of NON-RESIDENT CASUALTY SURGEON. Candidates must have held an appointment as House Surgeon at this Hospital or at another Hospital approved by the Board of Governors. The appointment is for a first period of 6 months with effect from 1st March, 1956; remuneration to be at Senior House Officer rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 31st January, 1956.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of Part-time OUTPATIENT SURGICAL ASSISTANT for 4 notional half-days per week (Tuesday P.M., Wednesday A.M., Thursday P.M., Friday P.M.). Graded Senior House Officer. The appointment will be for a first period of 12 months and the successful candidate will be required to commence duties as soon as possible.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service grading of previous and present appointments, together with names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 31st January, 1956.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. RESIDENT SURGICAL OFFICER (Senior Registrar grade) required for St. Peter's Hospital on 1st April, 1956. Applications invited from Male candidates on the British register who have completed their training in general surgery. Appointment for 6 months, with opportunity for a further 6 months if recommended. Candidates should be prepared to spend 1 year at the Hospital if required.

Applications (12 copies), with 12 copies of 3 recent testimonials, should reach the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2, by 3rd March, 1956.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 1st April, 1956, for a RESIDENT OFFICER to the Neurological and Neurosurgical Department (Senior House Officer).

Further particulars and form of application, which must be returned not later than Monday, 6th February, 1956, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy for a Whole-time ASSISTANT MEDICAL REGISTRAR (Registrar grade) in March, 1956.

Further particulars and form of application, which must be returned not later than 13th February, 1956, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THORPE COOMBE MATERNITY HOSPITAL, Walthamstow, E.17. (58 Beds.) Applications are invited from medical Women for the post of JUNIOR OBSTETRICS OFFICER (graded House Officer), vacant 15th February, 1956. The Hospital is recognised by The Royal College of Obstetricians and Gynæcologists.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to the Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 10th February, 1956. The appointment is recognised for the D.Obst. R.C.O.G.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to the Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1, and KINGSTON HOSPITAL, 26, Wolverton-avenue, KINGSTON-ON-THAMES, SURREY. Applications invited for joint appointment of SENIOR ANÆSTHETICS REGISTRAR, to start 1st March, 1956, or soonest after. Annual appointment up to 4 years. Successful candidates will work first at Kingston Hospital. Candidates should hold F.F.A.R.C.S.

Applications (14 copies), with names of 3 referees, to reach House Governor, Westminster Hospital, by 4th February.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT CASUALTY OFFICER required 6th February, Senior House Officer. Post recognised under Fellowship regulations.

Applications, with full particulars and names of 2 referees, to Hospital Secretary by 25th January, 1956.

ABERYSTWYTH GENERAL HOSPITAL. Mid-Wales HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital. Post recognised for F.R.C.S. Vacant on 31st January, 1956. The post is resident.

Applications, stating age, nationality, qualifications, and experience, accompanied by copies of 2 recent testimonials, should be sent to the Group Secretary, "Orlandon," 31, North-parade, Aberystwyth, within 14 days from the publication of this advertisement.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. HOUSE OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital (36 pædiatric beds). Recognised for D.C.H. Vacant mid-March.

Applications, with copies of 2 testimonials, to Group Secretary, Ashton-under-Lyne General Hospital, Ashton-under-Lyne.

AYLESBURY, BUCKINGHAMSHIRE. ROYAL BUCK-INGHAMSHIRE HOSPITAL. CASUALTY OFFICER (Senior House Officer) required 1st March. A flat is available at low rental.

Apply, with 2 copies of testimonials, to Secretary-Superintendent.

AYLESBURY, BUCKINGHAMSHIRE. TINDAL GENERAL HOSPITAL. HOUSE SURGEON (Male or Female). Pre-registration post, but registered practitioners invited to apply. The post offers wide experience of general surgery with operative practice; recognised for F.R.C.S. Vacant 12th March, 1956. The acute Surgical Unit consists of 95 Beds. No casualty department.

Please apply, with 2 copies of 2 testimonials, to the Administrative Officer as soon as possible.

ALTON, HAMPSHIRE. HENRY GAUVAIN HOSPITAL. (114 Beds.) LORD MAYOR TRELOAR GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for the Henry Gauvain Hospital (formerly Morland Clinics) for period of 1 year from the beginning of March, 1956. Non-pulmonary tuberculosis, orthopædic and general surgery. Married accommodation available in small cottage on estate. Primary or Final F.R.C.S. candidate preferred.

Apply as soon as possible to Surgeon-Superintendent, Henry Gauvain Hospital, Alton, Hants.

ALTON, HAMPSHIRE. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. Applications are invited from registered medical practitioners for the post of Whole-time ORTHOPÆDIC REGISTRAR. Post provides experience in non-pulmonary tuberculosis and general orthopædics and includes attendances at peripheral clinics. Accommodation available. Canvassing disqualifies, but visit to Hospital welcomed.

Write to Secretary for application form.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, 2 RESIDENT HOUSE SURGEONS (Male) for general surgical duties. 6 months appointments vacant (1) on 5th March and (2) on 8th March, 1956. Preference given to pre-registration candidates.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

ABERDEEN (near). THE DEESIDE SANATORIA. Applications are invited for the post of SENIOR HOUSE OFFICER. The Deeside Sanatoria includes Tor-na-Dee and Glen O'Dee located 7 and 18 miles from Aberdeen, respectively, and the successful applicant may be required to work at either Hospital. A Thoracic Unit is located at Tor-na-Dee and a large number of thoracic surgery cases are dealt with. The post offers valuable training in the selection of cases for major surgery and in their pre-operative and post-operative management. The appointment is tenable in the first instance for 1 year.

Applications, together with the names and addresses of 2 referees, should be sent to the Secretary, Board of Management for the Aberdeen Special Hospitals, 6, Queen's-terrace, Aberdeen, as soon as possible.

BARKING HOSPITAL (Maternity), Upney-lane, Barking. There will be a vacancy for a RESIDENT SENIOR HOUSE OFFICER at the above Hospital on 13th February, 1956. Salary being £745 p.a., less emoluments. Applicants should have been qualified not less than 1 year. Duties will include antenatal work.

Applications, accompanied by copies of testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Secretary,

Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

BARROW-IN-FURNESS. NORTH LONSDALE HOSPITAL. Applications are invited for a post of SENIOR HOUSE OFFICER (surgical) at the North Lonsdale Hospital, Barrow-in-Furness. Post recognised for F.R.C.S. National conditions and salary scale.

Applications to Group Secretary, Barrow and Furness Hospital Management Committee, 52, Paradise-street, Barrow-in-Furness.

BATH. ST. MARTIN'S HOSPITAL. (640 Beds.) Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER (Senior House Officer grade) at above Hospital.

Applications, stating age, qualifications and experience, with 2 testimonials, should be forwarded to the Group Secretary, Bath Hospital Management Committee, Manor Hospital, Bath, by 31st January, 1956.

BATH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from medical practitioners for the post of RESIDENT HOUSE PHYSICIAN. The Officer will, for the first 3 months be based at the Royal National Hospital for Rheumatic Diseases (attached to which is the Rheumatism Research Unit of the South Western and Oxford Regions), followed by 3 months at St. Martin's Hospital. The appointment is recognised for pre-registration purposes. Commencing date is 14th March, 1956.

Applications, stating age, qualifications and experience, with 3 testimonials, should be forwarded to the Group Secretary, Manor Hospital, Combe Park, Bath, by 7th February, 1956.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory with attendance at Branch Laboratory, Driffield. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BEVERLEY, YORKSHIRE. BROADGATE HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER. Progressive mental hospital of 600 Beds with outpatient clinics at general hospitals. Facilities for D.P.M. course at Leeds University. Single or married accommodation available. Candidates may visit Hospital by appointment with Physician-Superintendent.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorks.

BEXHILL HOSPITAL, Bexhill-on-Sea. (62 Beds.) House SURGEON required. Pre-registration post, vacant now. National scale of salary.

Apply to Hospital Administrator.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Pre-registration HOUSE SURGEON required immediately. The appointment offers exceptional opportunities for general experience in busy acute Surgical Unit.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. Required, SENIOR HOUSE OFFICER or HOUSE OFFICER (including pre-registration), according to experience.

Detailed applications, with copies of 2 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) SENIOR HOUSE OFFICER in Pathological Department (resident or non-resident). Previous House appointments essential. Must be available about 13th February, 1956.

Detailed applications, with copies of 2 recent testimonials, to Secretary.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) SENIOR HOUSE OFFICER (resident) required. Recognised for M.R.C.O.G. Department of Obstetrics and Gynæcology under control of Senior Consultant Obstetrician. Approximately 125 maternity beds, with 100 neonatal cots and 60 gynæcological beds. Vacant 1st March, 1956.

Applications, together with copies of 3 recent testimonials, to Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Stoke-on-Trent Group, Princes-road, Hartshill**

(*a*) REGISTRAR (gynæcology/obstetrics) for North Staffordshire Royal Infirmary (455 Beds). Higher qualification desirable. Recognised M.R.C.O.G. (gynæcology). Ample experience operative gynæcology available. Some beds abnormal obstetrics.

(*b*) REGISTRAR (orthopædics), for North Staffordshire Royal Infirmary (455 Beds), some duties at Hartshill Orthopædic Hospital (77 Beds). Non-resident. Experience specialty essential. Higher qualification an advantage.

(2) **West Bromwich and District Group, Edward-street, West Bromwich**

REGISTRAR (general medicine) for Hallam Hospital (456 Beds). Experience specialty essential. Higher qualification desirable.

Application forms from Group Secretaries, to be returned before 6th February, 1956.

BIRMINGHAM (near). ST. MARGARET'S HOSPITAL, GREAT BARR PARK, BIRMINGHAM, 22A. (For Mental Defectives—1470 Beds.) Locum JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female), required at above Hospital. Salary £17 10s. per week. Accommodation and board in Hospital available for which a charge of £130 p.a. will be made. The appointment will be for a period of 3 months in the first instance.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be forwarded immediately to the Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. OBSTETRIC HOUSE SURGEON (pre-registration). Post vacant mid-February.

Applications, stating age, qualifications and names for reference, to Medical Superintendent.

BIRMINGHAM, 9. YARDLEY GREEN HOSPITAL. THORACIC SURGICAL UNIT. (66 Beds.) Vacancy for SENIOR HOUSE OFFICER. No previous experience in thoracic surgery necessary.

Applications, stating age, qualifications, training and experience, together with names of 2 referees, to be addressed to Group Secretary, Yardley Green Hospital, Birmingham, 9.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required. Recognised pre-registration post. Vacant early February.

Apply, naming 2 referees, to Group Secretary at above address.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant mid-February. Recognised for D.Obst. R.C.O.G. Departmental beds 69.

Apply, naming 2 referees, to Group Secretary at above address.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. THE ROYAL INFIRMARY, BOLTON (237 Beds), BOLTON DISTRICT GENERAL HOSPITAL (604 Beds). RESIDENT HOUSE SURGEONS (2) for general surgical duties, 1 for each of above hospitals. Vacant mid-February, tenable for 6 months and recognised under Pre-registration Service Scheme. Also recognised for F.R.C.S.

Applications, with the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. FAIRFIELD GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry). The appointment is for 1 year in the first instance, subject to renewal annually. Facilities will be granted to take the D.P.M. in Manchester.

Applications, with full details of age, qualifications and experience, together with names of 2 referees, should be submitted to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury.

BLACKPOOL. VICTORIA HOSPITAL. (348 Beds.) HOUSE OFFICER (surgical). Pre-registration post recognised for F.R.C.S. Modern well-equipped hospital with excellent facilities for gaining experience (92 general surgical beds).

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL. VICTORIA HOSPITAL. House Physician. Pre-registration post available in mid-March at this modern Hospital serving the Blackpool and Fylde area.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, should be addressed to the Hospital Secretary.

BLACKPOOL AND FYLDE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pædiatrics). This combined post offers experience at the Victoria Hospital (348 Beds) with a 30-Bedded Children's Ward and at the Devonshire Road Hospital (128 Beds) with Infectious Diseases and E.N.T. patients. Approval recently given to increase in number of Consultant Pædiatrician sessions with view to development of Pædiatric Service. Post available from 1st April.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Group Secretary, Victoria Hospital, Blackpool.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the immediate appointment of SENIOR HOUSE OFFICER (resident), orthopædics and casualty combined. The post is recognised for the F.R.C.S. examination and is normally tenable for 12 months.

Applications to the Deputy Hospital Secretary at the Hospital.

BRIGHTON GENERAL HOSPITAL. House Physician (geriatrics). This is a large unit with an active rehabilitation section, providing excellent clinical facilities.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton, 7.

BRIGHTON GENERAL HOSPITAL. Casualty Medical OFFICER (for casualty and general duties). Post vacant 30th January, 1956. House Officer grade.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MAN-AGEMENT COMMITTEE. FRENCHAY HOSPITAL. (513 staffed beds, expanding.) Applications are invited for the post of SENIOR HOUSE OFFICER in the Regional Neurosurgery Department. Vacant early April. This post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MAN-AGEMENT COMMITTEE. Applications invited for the appointment of RESIDENT ANÆSTHETIST at Frenchay Hospital (513 staffed beds). The position offers experience in thoracic, plastic, neuro and general surgery. Vacant 1st March, 1956. The appointment will be made according to qualifications and experience in either the Senior House Officer or House Officer grade.

Applications, with particulars of age, qualifications and previous posts and the names of 2 referees, should be sent to the Group Secretary, Frenchay Hospital, by 4th February, 1956.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Vacancies on 1st February, 1956, for HOUSE SURGEONS in General Surgery at Cossham Memorial Hospital (88 Beds) and at Frenchay Hospital (513 Beds). Tenure 6 months. Recognised pre-registration posts but fully registered practitioners will also be considered. Appointments are recognised for F.R.C.S. examinations.

Apply to Group Secretary, Frenchay Hospital, Bristol, quoting qualifications, experience and names of 2 referees.

BRISTOL. SOUTHMEAD GENERAL HOSPITAL GROUP MANAGEMENT COMMITTEE. Required at Snowdon Road Hospital (300 Beds—chronic sick, general medical cases, tuberculosis and dermatology) SENIOR HOUSE OFFICER (medical) for 12 months commencing 1st February, 1956.

Applications to be submitted to the Group Secretary, Southmead Hospital, Bristol.

BROMSGROVE GENERAL HOSPITAL, Worcestershire. (423 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON at the above Hospital. Post now vacant.

Applications, with the names of 3 referees, to the Hospital Secretary.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required from 1st February, 1956. Senior House Officer or House Officer (Intern) grade. Post recognised for F.R.C.S. and Pre-registration Service. Preference given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CHESTERFIELD HOSPITAL MANAGEMENT COM-MITTEE. Whole-time JUNIOR HOSPITAL MEDICAL OFFICER required for Whittington Hall, Chesterfield (372 female mentally deficient patients), and Scarsdale Hospital Chesterfield. Salary scale £775–£50–£1075 p.a. Residential accommodation available for married officer at Dronfield Hospital.

Apply, giving names of 2 referees, to M. H. BOONE, Secretary, at Chesterfield Royal Hospital.

CHESTERFIELD ROYAL HOSPITAL. Senior House OFFICER required at above Hospital for Accident and Orthopædic Department. Post recognised for F.R.C.S. training and offers valuable experience. National salary and conditions.

Apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee.

CHESTERFIELD ROYAL HOSPITAL. House Surgeon required immediately at above Hospital. Post recognised for Pre-registration Service and F.R.C.S. purposes. National salary and conditions.

Apply M. H. BOONE, Secretary.

CHELTENHAM GENERAL HOSPITAL. (226 Beds.) 2 HOUSE SURGEONS (pre- or post-registration) required. Both posts recognised for the F.R.C.S. and giving a large and wide experience in general surgery, gynæcology, orthopædics and genito-urinary surgery. Posts vacant now.

Apply STANLEY T. DAVIS, Group Secretary.

General Hospital, Sandford-road, Cheltenham.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute beds.) RESIDENT HOUSE SURGEON required for 6 months appointment. National salary scale for first, second, or third posts. Post approved for pre-registration practitioners. Also recognised for F.R.C.S. 7 residents including Resident Surgical Officer and 3 House Surgeons. Vacant from mid-January, 1956.

Apply to Senior Administrative Officer.

CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.) Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar status) vacant early March, 1956, for 1 year in first instance. Hospital recognised for F.R.C.S.

Forms of application from Group Secretary, 174, Broyle-road, Chichester.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. HOUSE SURGEON (pre-registration post). General surgery with duties in genito-urinary. Vacant 12th February.

Applications, giving age, qualifications, &c., with copies of recent testimonials and the names of referees, should be sent to the Secretary at above address.

COLCHESTER HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited for :—

Essex County Hospital, Colchester (188 Beds)

HOUSE PHYSICIAN. First, second, third or pre-registration post, tenable for 6 months.

Black Notley Hospital, Braintree (528 Beds)

HOUSE OFFICER (orthopædic surgery). First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

Posts of HOUSE SURGEON and HOUSE PHYSICIAN. The successful applicant will serve 6 months as House Surgeon followed by 6 months as House Physician. First, second, third or pre-registration posts. Surgical post includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S. Medical post includes duties in medical and pædiatric wards.

Essex County Hospital (19 gynæcological beds)

Colchester Maternity Hospital (22 obstetric beds)

HOUSE OFFICER (Male or Female), obstetric and gynæcological. First, second, third or pre-registration post; tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester, Essex.

COLCHESTER HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited for :—

Black Notley Hospital, Braintree (528 Beds)

SENIOR HOUSE OFFICER for Non-pulmonary Tuberculosis Unit of approximately 120 Beds, particularly for skeletal and renal tuberculosis. Recognised for F.R.C.S.

Clacton and District Hospital, Clacton-on-Sea (58 Beds)

SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Harwich and District Hospital, Dovercourt (30 Beds)

SENIOR HOUSE OFFICER. Duties mainly surgical, but there is a proportion of medical beds. In addition there are surgical, medical, E.N.T. outpatient and casualty work. Post tenable for 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester, Essex.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (108 Beds—Acute.) Locum ANÆSTHETIST required at the above Hospital for the period 1st–15th March (8 sessions per week) and 16th–31st March (9 sessions per week). Salary in accordance with Whitley Council scale.

Apply for full particulars to the Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich, Cheshire.

DONCASTER ROYAL INFIRMARY. Doncaster Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopædic Department. Vacant end January.

Applications to the Secretary to the Committee at the Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON, vacant end January. Approved as pre-registration post and recognised for F.R.C.S.

Applications to the Secretary to the Committee, at the Doncaster Royal Infirmary.

DONCASTER. WESTERN HOSPITAL. Applications are invited from registered medical practitioners for the appointment of RESIDENT MEDICAL OFFICER in the grade of Junior Hospital Medical Officer.

Applications, stating age, qualifications and experience, together with copies of 3 recent testimonials, should be forwarded to the Secretary to the Committee, Doncaster Hospital Management Committee, Doncaster Royal Infirmary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. House SURGEON (pre-registration) or SENIOR HOUSE OFFICER (gynæcology), vacant 1st February, 1956. Recognised for M.R.C.O.G.

Apply, stating full details with copies of 2 recent testimonials to Hospital Secretary.

DERBY. CITY HOSPITAL. House Surgeon (pre-registration) or SENIOR HOUSE OFFICER surgical), vacant 13th February. The post is recognised for the F.R.C.S.

Apply, stating full details with copies of 2 recent testimonials, to the Medical Superintendent as soon as possible.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (311 Beds.) HOUSE OFFICER (general medicine and dermatology), vacant 1st March, 1956, and tenable for 6 months. Recognised pre-registration post. The Hospital has 70 acute medical beds.

Applications, with full details and quoting this journal, to the Administrative Officer at the Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) MEDICAL REGISTRAR, North Cambridgeshire and Clarkson Hospitals, Wisbech (271 Beds). Post provides experience in general medicine, pædiatrics, and geriatrics, also facilities for study. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, North Cambridgeshire Hospital, Wisbech.

(2) RADIOLOGICAL REGISTRAR, West Suffolk Group of hospitals. Main hospital, West Suffolk General, Bury St. Edmunds (285 Beds). Successful applicant will work directly under the Consultant Radiologist. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

Appointments for 1 year, renewable for second year.

Applications, stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 6th February, 1956.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) SENIOR ORTHOPÆDIC REGISTRAR, United Norwich Hospitals. Main hospital Norfolk and Norwich—441 Beds. Trainee post. Higher qualification desirable.

(2) REGISTRAR in Geriatrics, Norfolk and Norwich Group of hospitals (total geriatric beds 590). Main hospital is the West Norwich Hospital where the Geriatric Department is the pivotal point of the area service which is being developed on active lines under the Consultant Physician in Geriatrics. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge by 30th January, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

EAST FIFE HOSPITALS BOARD OF MANAGEMENT. REGISTRAR in Radiology required for duties in Fife based on Kirkcaldy General Hospital. Candidates should be in possession of the D.M.R.(D.).

Apply, stating qualifications, experience, and the names of 2 referees, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

EDGWARE GENERAL HOSPITAL. (715 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (whole time), resident, required in Department of Anæsthesia at above Hospital, vacant 13th March, 1956. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 31st January, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (non-resident), required in the Casualty Department at above Hospital.

Apply, stating age, nationality, qualifications and experience, together with names and addresses of 2 referees, to Group Secretary, Edgware General Hospital, by 28th January, 1956.

EDINBURGH. ASTLEY AINSLIE HOSPITAL. Astley AINSLIE, EDENHALL AND ASSOCIATED HOSPITALS. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital, which affords excellent opportunities for the study of convalescence and rehabilitation. Experience in the specialty desirable.

Applications, giving full details, and the names and addresses of 3 referees, should be lodged on or before 18th February, with the Secretary, Astley Ainslie Hospital, Grange Loan, Edinburgh.

EDINBURGH CENTRAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited from registered medical practitioners and pre-registration graduates, for resident appointments for 6 months, commencing 1st April, 1956. National Health Service scale.

Royal Hospital for Sick Children
1 HOUSE SURGEON (E.N.T.).
3 HOUSE PHYSICIANS.

Princess Margaret Rose Hospital
2 HOUSE SURGEONS.

Chalmers Hospital
1 HOUSE PHYSICIAN.
1 HOUSE SURGEON.
1 HOUSE SURGEON (Gynæcological and Children's Surgical Annexe).

Applications, stating age, qualifications and experience and names of 2 referees, to be sent within 14 days to Medical Superintendent, 18, Rillbank-terrace, Edinburgh, 9.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 1st February, 1956. Pre-registration post. Recognised for F.R.C.S.

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary, at above address.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON (pre-registration post), vacant 22nd March, 1956. Duties with general Surgical Unit, doing some genito-urinary work. Post recognised by the Royal College of Surgeons. 6 months appointment.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. Applications are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer grade) for duties in the Area Laboratory and at other hospitals in the Group. The Area Laboratory is recognised for the Diploma of Pathology of the Royal Colleges of Physicians and Surgeons. Further information can be obtained from the Senior Pathologist. Appointment tenable for 1 year.

Applications, with the names of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, immediately.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) Senior HOUSE OFFICER in Anæsthetics required for 1 year from 28th February. Recognised for D.A. and F.F.A.R.C.S.

Apply stating age, qualifications with dates, and experience, and naming 3 referees, to Administrative Officer by 28th January.

GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following pre-registration HOUSE SURGEON appointments to commence on 1st February, 1956.

Morriston Hospital (501 Beds)—2 vacancies.

Swansea Hospital (403 Beds)—1 vacancy.

Applications, with full particulars together with copies of 2 testimonials, should be forwarded to the Group Secretary, Glantawe Hospital Management Committee, St. Helen's-road, Swansea.

GLASGOW. ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW, C.3. Applications are invited for the post of RESIDENT HOUSE SURGEON (orthopædics) at the above Hospital for the period 1st February–31st July, 1956. This is not a pre-registration post.

Applications should be addressed to the Medical Superintendent.

GLASGOW ROYAL INFIRMARY. Junior Hospital MEDICAL OFFICERS in Orthopædic Surgery (2 vacancies).

Apply in writing not later than 31st January, 1956, giving 3 names for reference, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLOUCESTER. GLOUCESTERSHIRE ROYAL HOS-PITAL, Southgate-street. (225 Beds.) Applications are invited for the post of CASUALTY OFFICER, vacant February. The department deals with majority of accidents from large area, offers favourable experience. Recognised for F.R.C.S. examination. Salary Senior House Officer or Junior Hospital Medical Officer grade, according to experience and qualifications.

Applications, naming 2 referees, to Secretary.

GREENOCK. RAVENSCRAIG (MENTAL AND GEN-ERAL) HOSPITAL. (472 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (resident post). Mental and general experience to be gained. Hospital is recognised as a training centre for the D.P.M. examination.

Applications, in writing, to the Physician-Superintendent as soon as possible.

GRIMSBY GENERAL HOSPITAL, Grimsby, Lincoln-SHIRE. Applications are invited for SENIOR HOUSE OFFICER for duties in E.N.T. and Ophthalmology Departments with some orthopædic duties. Up-to-date Medical Library and reading facilities available. Salary £745 p.a., less £150 p.a. for board and lodging.

Applications, with names of 2 referees, to Hospital Secretary.

GRIMSBY. SPRINGFIELD HOSPITAL. (210 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (chest and infectious diseases) required. Unfurnished accommodation is available for a married man. Post becomes vacant 22nd April. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th January, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GUILDFORD. ST. LUKE'S HOSPITAL. Guildford GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time REGISTRAR, preferably resident, in the Radiotherapy Unit, at above Hospital, where extensive experience in both surgical and radiation treatment of malignant disease can be obtained. Candidates may visit the Unit by arrangement direct.

Application forms obtainable from Secretary, Guildford Group Hospital Management Committee, St. Luke's Hospital, Guildford, to whom they should be returned not later than 4th February, 1956.

HALIFAX. ROYAL HALIFAX INFIRMARY. Senior HOUSE OFFICER in General Surgery required.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON required. Pre-registration post vacant 5th February, 1956. National scale of salary.

Apply to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) SENIOR HOUSE OFFICER (casualty and orthopædic) required. Post vacant 3rd March, 1956. National scale of salary.

Apply to Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. CASUALTY OFFICER (Junior Hospital Medical Officer) required.

Applications, stating 2 names for reference, should be sent to the Hospital Secretary.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary.

HEREFORD. COUNTY HOSPITAL. (335 Beds.) House OFFICERS (medicine) required.

Applications, with copies of 2 recent testimonials, to be sent to the Medical Superintendent, County Hospital, Hereford.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general—first, second, or third post). To commence as soon as possible. Pre-registration post. Recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Group Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £745 p.a., less £130 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 1st February, 1956.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL, Hertford, Hertfordshire. Applications are invited from registered medical practitioners resident in or near Hertford for the appointment of PRACTITIONER OBSTETRIC CLINICAL ASSISTANT now available at Hertford County Hospital (Maternity Unit—22 Beds). The primary purpose of the appointment is to secure the services of a practitioner on an "on call" basis for emergency work and consultations when the Hospital's Consultant Obstetrician is not available. Applicants should possess an obstetric qualification or have had special obstetric experience. Remuneration will be made in accordance with the National Health Service terms and conditions of service of hospital medical staff (i.e., at the rate of £2 per emergency visit).

Applications, together with names of 2 referees, to the Secretary, Hertford Group Hospital Management Committee, Hertford County Hospital.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—629 Beds.) HOUSE SURGEON (resident) required for obstetric duties. Previous obstetric experience desirable, but not essential. Post recognised for D.Obst.R.C.O.G. and M.R.C.O.G. and vacant middle February.

Applications, stating age, nationality, qualifications and experience and enclosing copies of not more than 3 recent testimonials, to Medical Director by 30th January.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—629 Beds.) HOUSE SURGEON (resident) required for gynæcological duties. Previous gynæcological experience desirable, but not essential. Post recognised for M.R.C.O.G. and vacant beginning March.

Applications, stating age, nationality, qualifications and experience and enclosing copies of not more than 3 recent testimonials, to Medical Director by 30th January.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. (General—629 Beds.) PÆDIATRIC HOUSE PHYSICIAN (resident) required. Duties include experience in general children's medical ward, Neonatal Unit and pædiatric out-patient clinics. Post recognised for D.C.H. and vacant early March. Pre-registration House Officers may also apply.

Applications, stating age, qualifications, nationality and experience with copies of not more than 3 recent testimonials, to Medical Director by 2nd February.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT CASUALTY OFFICER (Senior House Officer grade), recognised for F.R.C.S. examination. Post vacant 15th February, 1956.

Applications, stating age, qualifications, experience, with copies of 3 recent testimonials or names for reference, to the Hospital Secretary.

HOVE GENERAL HOSPITAL, Sussex. (75 Beds.) RESIDENT HOUSE SURGEON AND CASUALTY OFFICER required from 1st February, 1956. Post recognised for F.R.C.S., but not pre-registration.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Administrative Officer as soon as possible.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (Female) required to commence duty immediately. The post is recognised as a pre-registration appointment. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT JUNIOR HOUSE SURGEON (pre- or post-registration). Busy acute general Surgical Unit. Vacant now.

Applications, with 2 recent testimonials or names of 2 referees, to be sent to Hospital Secretary as soon as possible.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration post), resident, and tenable for 6 months, vacant mid-February.

Applications, with 2 recent testimonials, to the Hospital Secretary.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE PHYSICIAN. Duties in an active Geriatric Unit for the investigation and treatment of acute and long-term illness. Resident post.

Applications, with full particulars, to the Hospital Secretary.

ILFORD AND BARKING GROUP HOSPITAL MANAGEMENT COMMITTEE. There will be a vacancy on 1st April, 1956, for a SENIOR HOUSE OFFICER ANÆSTHETIST at the King George Hospital, Ilford. The Officer appointed will be required to be available for duty in other hospitals in the Group. Salary will be at the rate of £745 p.a., less £145 p.a. emoluments.

Applicants should have been registered not less than 1 year, and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Group Secretary.

King George Hospital, Ilford.

ILFORD MATERNITY HOSPITAL, Eastern-avenue, ILFORD. There will be a vacancy for a SENIOR HOUSE OFFICER (obstetrics and also entails care of some gynæcological beds) at the above Hospital on 1st March, 1956. Salary will be at the rate of £745 p.a., less emoluments. This post is recognised for training for the D.Obst.R.C.O.G.

Applicants should have been registered not less than 1 year and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the General Consulting Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of SENIOR HOUSE SURGEON to the Fracture and Orthopædic Department, vacant on 1st February, 1956. The post is graded Senior House Officer and is recognised for the F.R.C.S. examinations. The Department has 2 Consultants, about 60 beds and a large outpatient attendance ; it offers wide experience.

Applications, stating age, nationality and experience, together with copies of recent testimonials, to the Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Applications invited from registered dental practitioners for resident post DENTAL HOUSE SURGEON for period 6 months—commencing February. First, second, or third term appointment. Third term post candidates given preference. Hospital recognised for F.D.S. by Royal College of Surgeons of England. Terms and conditions of service of hospital medical and dental staffs will apply.

Applications, stating age, qualifications with dates, details of experience, names and addresses of 3 referees, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 17th February, 1956.

KETTERING GENERAL HOSPITAL, Northamptonshire. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. The post becomes vacant on 1st March, 1956. It offers wide experience of all traumatic conditions, including fractures and some orthopædic cases, with charge of 30 beds.

Applications, accompanied by testimonials, to be sent to the Secretary at the above address.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of Locum SENIOR HOUSE OFFICER (orthopædic and casualty). The post, which is whole-time, may be resident or on a duty room basis by arrangement and is available for 2 weeks from 11th February, 1956.

Applications to the Physician-Superintendent within 7 days with 2 recent testimonials.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably experienced medical officers for the post of Locum SENIOR HOUSE OFFICER (general surgery). The post is available for 4 weeks from 4th to 31st March, 1956, inclusive, and may be resident or on a duty room basis by arrangement.

Applications to the Physician-Superintendent, with 2 recent testimonials, as soon as possible.

KNOWLE GROUP OF HOSPITALS, Hampshire. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER to the above Group, comprising mental hospitals at Fareham (Hants) and Salisbury (Wilts). All forms of modern psychiatric treatment are undertaken. Previous psychiatric experience is not essential as training facilities will be available. Service will be at Knowle Hospital, Fareham, in the first instance, but applicants may subsequently be required to serve at either Hospital. Terms and conditions of service as approved for hospital medical staff employed in the National Health Service. Salary £775–£50–£1075 p.a. Single residential accommodation is available, but officers who so desire, may live outside the Hospital.

Applications should be sent without delay to the Physician-Superintendent, Knowle Group of Hospitals, Knowle, Fareham, Hants.

LEEDS (near). SCALEBOR PARK HOSPITAL, Burley-IN-WHARFEDALE, near LEEDS. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female) at Scalebor Park, a modern hospital of 366 Beds for the active treatment of nervous and mental disorders. The Hospital is associated for teaching purposes with the Department of Psychiatry of Leeds University, and facilities will be granted for attending the D.P.M. course. The salary and conditions of service are in accordance with Whitley Council scales. A semi-detached house will be available for a married man, for which an agreed rental will be payable.

Applications to the Medical Superintendent immediately.

LINCOLN. HARMSTON HALL HOSPITAL. Junior HOSPITAL MEDICAL OFFICER (resident) required for group of mental deficiency hospitals in Lincolnshire (943 Beds). Salary scale £775–£50–£1075 with national terms and conditions of service. Travelling expenses as approved. Furnished apartments charged at £160 p.a.

Applications, with full details of age, education, qualifications, previous appointments with dates, and 2 names for reference, to be sent to the Group Secretary, Harmston Hall, Lincoln, within 10 days.

LINCOLN. COUNTY HOSPITAL. (200 Beds. Recognised training hospital for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th January, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LIVERPOOL, 6. NEWSHAM GENERAL HOSPITAL, Belmont-road. (1304 Beds.) Applications are invited from medical practitioners for the following appointments which may be resident or non-resident and occur in March, 1956 :—

HOUSE PHYSICIANS in General Medicine, pre-registration or Senior House Officer status according to qualifications and experience.

HOUSE SURGEON (pre-registration).

Applications to the Physician-Superintendent at the Hospital as soon as possible.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (Male or Female) for the Psychiatric Unit at the above-named Hospital for the 6 months period commencing 1st March, 1956. The post is approved as a pre-registration post. The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Applications, stating age, qualifications with dates, and details of experience, should be sent to the undersigned as soon as possible. GARNET CHAPLIN, Secretary to the Committee.

LOUTH, LINCOLNSHIRE. COUNTY INFIRMARY. (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER (medical), now vacant, at this busy general hospital.

Applications, with full details, together with names of 2 referees, should be addressed to the Hospital Secretary.

LUTON, BEDFORDSHIRE. ST. MARY'S HOSPITAL. Locum SENIOR HOUSE OFFICER required for whole of March. The Hospital consists of 129 Beds for chronic sick and 33 Beds for chest diseases.

Applications to be sent to the Secretary, Luton and Hitchin Hospital Management Committee, at the above Hospital, as soon as possible.

MACCLESFIELD, CHESHIRE. PARKSIDE MENTAL HOSPITAL. PARKSIDE HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. RESIDENT REGISTRAR in Psychiatry required at above Hospital. Married accommodation available.

Applications to be made to the Medical Superintendent, accompanied by 2 recent testimonials.

MACCLESFIELD HOSPITAL. (301 Beds.) Applications invited CLINICAL PATHOLOGIST (resident or non-resident). Senior House Officer grade. Vacant late February. Post recognised for D.Path., equally suitable for those who later wish to do general medicine.

Apply, with names and addresses of 2 referees, to Group Secretary, Macclesfield and District Hospital Management Committee, "Willerby House," Cumberland-street, Macclesfield.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL. (380 Beds.) RESIDENT SENIOR HOUSE OFFICER (anæsthetics) required to take up duty as soon as possible.

Applications to be sent to the Group Secretary, Booth Hall Hospital, Blackley, Manchester, 9, from whom further particulars may be obtained.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the post of REGISTRAR in the Department of Neurosurgery at the above Hospital. The holder of the post will be allowed more scope than is usual in larger departments.

Applications, with full details and names of 2 referees, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the resident appointment of SENIOR HOUSE OFFICER in the Genito-urinary Department with general surgical work in another unit at the above Hospital. Recognised for F.R.C.S.

Applications, with full details and names of 2 referees, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of REGISTRAR in Pathology. The duties will be with the Stockport and Buxton Hospital Management Committee and the successful candidate will work under the direction of the Consultant Group Pathologist.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of RESIDENT REGISTRAR in the Board's Non-tuberculous Thoracic Surgery Unit of 58 Beds at Park Hospital, Davyhulme. 1 year appointment renewable. Post now vacant.

Application forms from Secretary, Park Hospital, Davyhulme.

MANCHESTER REGIONAL HOSPITAL BOARD. RESIDENT MEDICAL OFFICER (Registrar grade) post vacant at Birch Hill Hospital, Rochdale, 1st March, 1956.

Apply at once, with names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited from registered medical practitioners, Male or Female, for the post of HOUSE PHYSICIAN in the Neonatal Unit of Saint Mary's Hospitals (attached to the University Department of Child Health) for a period of 6 months, vacant on 24th March, 1956. Previous hospital experience essential and pædiatric experience desirable. Duties include the care of the newborn in the Maternity Department, the care of infants in the infants' ward and work in the clinics under the charge of the Department of Child Health. Salary in accordance with national scale.

Application, stating qualifications and experience, together with the names of 3 referees, should be sent to the undersigned not later than 27th January, 1956.

A. R. WISE, General Superintendent.
Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for 4 posts of HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The posts are recognised for the purposes of the M.R.C.O.G. examination. The appointments are for 6 months, starting 1st April, 1956. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 28th January, 1956.

A. R. WISE, General Superintendent.
Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics. Applicants must have had previous hospital experience in general medicine and surgery, and in obstetrics. The post is recognised for purposes of the M.R.C.O.G. examination. The duties involve clinical responsibility for mothers and babies, and supervision of the work of pre-registration House Officers is also included. The appointment is for 12 months from 1st April, 1956. National scale.

Application forms may be obtained from the undersigned and returned not later than 28th January, 1956.

A. R. WISE, General Superintendent.
Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for SENIOR HOUSE OFFICER post. Salary £745 p.a., less £155 p.a. for residential emoluments.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR. Whole-time post (non-resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications to be made on forms obtainable from the undersigned as soon as possible.

F. J. CABLE, Secretary to the Board of Governors.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (surgical) to commence as soon as possible. Whole-time non-resident training post, tenable for 6 months, renewable for a second 6 months. Duties allotted in Orthopædic, Surgical Outpatients and General Surgical Units in rotation.

Application form obtainable from the undersigned, to be returned by 1st February, 1956. G. H. TAYLOR, Secretary.

MANCHESTER. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. The Board invite applications from registered practitioners for the post of RESIDENT SURGICAL OFFICER (Registrar grade). Candidates must hold the F.R.C.S.

Applications, with full details, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. The Board invite applications from registered practitioners for the post of MEDICAL REGISTRAR.

Applications, stating age, qualifications, present post, experience and names of 2 referees, to be forwarded to the Group Secretary at the Hospital within 7 days of the appearance of this advertisement.

MANCHESTER, 4. ANCOATS HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (surgery) to act as Assistant Resident Surgical Officer and for duties in the Department of Orthopædic Surgery. Recognised for F.R.C.S.

Applications, with names of 2 referees, by 30th January, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

NEATH. TONNA CHILDREN'S HOSPITAL, Tonna, NEATH. (90 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics, E.N.T., ophthalmic, orthopædic and traumatic). Post under supervision of Consultant Pædiatrician and particularly suited to candidates studying for D.C.H. Appointment available 8th March, 1956.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, Mid Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

MARKET DRAYTON (near), SHROPSHIRE. CHESHIRE JOINT SANATORIUM. (305 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required. Applicants with less than 2 years experience considered, in the grade of Senior House Officer. Resident.

Detailed applications to Medical Superintendent at the Sanatorium.

NEWCASTLE REGIONAL HOSPITAL BOARD. North WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR ANÆSTHETIST (whole-time), resident. Single accommodation available.

Applications, with names and addresses of 3 referees, to be forwarded to Deputy Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. South WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR in Chest Diseases, Holywood Hall Hospital, Wolsingham, Bishop Auckland (170 Beds), including Major Thoracic Surgical Unit of 20 Beds, and associated hospitals and chest clinic. Bungalow available, furnished or unfurnished.

Applications, with names and addresses of 3 referees, to be sent to the Deputy Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Sheff- FIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (thoracic surgery) required. Appointment for 1 year in first instance. Thoracic Unit at City Hospital undertakes non-tuberculosis and cardiological cases; tuberculosis surgery undertaken at modern unit in nearby Sanatorium. Appointee encouraged to attend. Previous thoracic surgical experience desirable.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th January, 1956, giving age, nationality, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applica-tions are invited for the post of HOUSE SURGEON, vacant 1st March, 1956. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE SURGEON (pre-registration—first or second post) required about 6th February for 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE PHYSICIAN (pre-registration first or second post), required 11th February for 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

ORPINGTON HOSPITAL, Orpington, Kent. Resident ANÆSTHETIST (Senior House Officer), Male, required. General Hospital—813 Beds. Post recognised for D.A.

Apply Physician-Superintendent.

ORPINGTON HOSPITAL, Orpington, Kent. Senior HOUSE OFFICER (orthopædics), Male, required. Appointment for 1 year from 1st March, preferably resident. Post recognised for F.R.C.S.

Applications, with a copy each of 2 testimonials, to Physician-Superintendent by 28th January, 1956.

OXFORD REGIONAL HOSPITAL BOARD. Senior REGISTRAR (whole-time) in Psychiatry, to hospitals in the Berkshire Mental Group. Approximately 7 sessions will be concerned with mental deficiency and child guidance based on Borocourt Hospital and 4 sessions with adult psychiatry based on Fair Mile Hospital. Candidates must hold the D.P.M. or equivalent. Married accommodation available.

Applications on forms obtainable from the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, should reach him by 5th February.

OXFORD. UNITED OXFORD HOSPITALS. Applica-tions invited for post of Trainee RESIDENT SENIOR HOUSE OFFICER to Oxford Eye Hospital (52 Beds) with effect from 1st March, 1956. The successful candidate will, if found suitable, be appointed resident Senior House Officer for 6 months from 1st October, 1956, at the Royal Berkshire Hospital (Ophthalmic Department) and a further 6 months as Senior Resident Officer at Oxford Eye Hospital at a salary of £850 p.a. Applicants must have had previous experience in ophthalmology. The post is recognised for the F.R.C.S. examination in Ophthalmics.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to Administrator, Radcliffe Infirmary, Oxford, by 6th February, 1956.

PAISLEY AND DISTRICT HOSPITALS BOARD OF MANAGEMENT. ROYAL ALEXANDRA INFIRMARY. Applications are invited from suitably qualified medical practitioners for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident), Orthopædic and Fracture Unit. The post becomes vacant on 1st February, 1956.

Applications, stating age, date of qualification, &c., should be submitted to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. House PHYSICIAN (resident, Male), post vacant 1st February, 1956. Recognised pre-registration post which offers excellent experience.

Applications should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, Devon, immediately.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road. SENIOR HOUSE OFFICER in Anæsthetics, vacant 1st April, 1956, recognised for the D.A. and Fellowship. The appointment will be for a period of 12 months.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY. Applications invited from duly qualified and registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology, vacant 1st April, 1956. There will be additional duties at the Plete Maternity Home, and the Alexandra Maternity Home, which are parts of the Department. Candidates should have had previous experience in a department of obstetrics and gynæcology. The appointment will be for a period of 12 months. Salary £745 p.a. Terms and conditions of service are in accordance with the National Health Service terms. The post is recognised by the Royal College of Obstetricians and Gynæcologists for the Membership examination of the College.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 3 referees, should be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for M.R.C.O.G., D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A. R.C.S., D.A.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgical), to commence 1st February, 1956 (to include duties at Porth and District Hospital).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Saint Mary's Hospital (130 surgical beds)
HOUSE SURGEONS (pre-registration), vacant 25th January, 26th January, 30th January.

Saint Mary's Hospital (74 acute medical beds)
HOUSE PHYSICIANS (pre-registration), vacant 31st January, 24th February.

St. Mary's Hospital (53 pædiatric beds)
HOUSE PHYSICIAN, vacant 15th February.

Queen Alexandra Hospital (78 acute medical beds)
HOUSE PHYSICIAN (pre-registration) vacant 1st February, 1956.

Royal Portsmouth Hospital (Orthopædic Department —104 Beds)
HOUSE OFFICER (pre-registration), vacant now.

Royal Portsmouth Hospital (70 surgical beds)
HOUSE SURGEON (pre-registration), vacant 1st February.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.
35, Grove-road South, Southsea.

PORTH AND DISTRICT HOSPITAL, Porth, Rhondda. (110 Beds—visited regularly by Consultants from Cardiff Royal Infirmary.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (surgical). Married quarters available. Maximum tenure of appointment 3 years but holder may apply for reappointment.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Courthouse-street, Pontypridd.

PETERBOROUGH. THE MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopædic). Applications are invited for this position, vacant now. Exceptional experience offered in busy department.

Apply to the Secretary, Memorial Hospital, Peterborough.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited for the appointment of CASUALTY OFFICER (Senior House Officer grade) at the above Hospital. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, accompanied by copies of 2 recent testimonials, should be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE SURGEON required at Birch Hill Hospital, Rochdale. Post now vacant. Pre-registration candidates eligible for this post which is recognised for 6 months F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident) required from 6th February, 1956, for duties in the Casualty and Admissions Department. This is a large General Hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be forwarded immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE OFFICER (general surgery) required from 13th February, 1956. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications should be forwarded immediately to Medical Superintendent, stating also names of 2 referees.

READING. ROYAL BERKSHIRE HOSPITAL. (405 Beds.) Applications are invited from registered or provisionally registered medical practitioners, Male or Female, for post of RESIDENT HOUSE SURGEON (general surgery), vacant 21st February, 1956, for period of 6 months. Salary £425–£525 p.a., less £125 board-residence.

Write, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (405 Beds.) Applications are invited from registered and provisionally registered medical practitioners, Male or Female, for post of RESIDENT HOUSE SURGEON (E.N.T.), vacant 21st February, 1956, for period of 6 months. Salary £425–£525 p.a., less £125 board-residence.

Write, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (401 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the resident post of HOUSE SURGEON (gynæcology) vacant 1st February, 1956, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, and present post, with copy of 1 recent testimonial, to Secretary.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of REGISTRAR in Orthopædic Surgery. The main duties are at Raigmore Hospital, Inverness.

Schedules of application and further particulars are obtainable from the undersigned, with whom applications should be lodged by 6th February, 1956. A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of REGISTRAR in Anæsthetics. Duties mainly at the Royal Northern Infirmary and Raigmore Hospital, Inverness.

Forms of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by 13th February, 1956. A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD invite applications for a Whole-time RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER post at Culduthel Hospital, Inverness (102 Beds—tuberculosis and infectious diseases). Appointment to be held for 1 year, but may be extended for a second year. Accommodation is available for a married officer.

Further particulars and schedules of application, which are obtainable from the undersigned, should be lodged by 6th February, 1956. A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in E.N.T. Surgery at the Royal Infirmary of Edinburgh, vacant on 21st March, 1956.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 11th February, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Pathology based at Stobhill Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 4th February, 1956.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Immediate vacancy for RESIDENT HOUSE SURGEON (Senior House Officer).

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY. ORTHOPÆDIC/ACCIDENT HOUSE SURGEON (Senior House Officer). Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry, for postgraduate study, with the Consultant. Post recognised under revised Fellowship regulations in respect of 6 months training required for the Final Fellowship examination.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Psychiatry required for Middlewood Hospital, Sheffield (2098 Beds). D.P.M. essential. House available. Appointment for 1 year in the first instance, reviewable annually. Opportunity for research and experience in the special branches of psychiatry available in the Hospital area.

Application forms and further details obtainable from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 6th February.

SHEFFIELD. LODGE MOOR HOSPITAL. (496 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (infectious diseases) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th January, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. NETHER EDGE HOSPITAL. Applications are invited for the resident post of SENIOR HOUSE OFFICER. Main duties will be in connection with the Maternity Unit but will also be required to assist in the wards for long-stay medical cases. Small flat available on rental.

Applications, giving full details of age, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to W. STANSFIELD, at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following resident posts :—

Royal Hospital Unit

(*a*) SENIOR HOUSE OFFICER in Anæsthetics. Post vacant 12th April, 1956.

Jessop Hospital for Women

(*b*) SENIOR HOUSE OFFICER in Obstetrics. Post vacant 1st April, 1956.

Applications for the above posts should state age, qualifications, and experience, give the names of 3 referees, and be sent immediately to :—

For post (*a*) : The Superintendent, Royal Hospital, West-street, Sheffield, 1.

For post (*b*) : The Superintendent, Jessop Hospital, Leavygreave-road, Sheffield, 3.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. ANÆSTHETIC REGISTRAR (resident) required at above Hospital. Post recognised for D.A. and F.F.A.R.C.S. Duties to be performed at Upton Hospital and other hospitals in the Group. Hospital may be visited by direct appointment.

Application form from, and returnable to, Group Secretary, Windsor Group Hospital Management Committee, Almaroad, Windsor, by 30th January.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum ANÆSTHETIC REGISTRAR required from 3rd to 13th February.

Applications, together with names of 2 referees, to Hospital Secretary.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) CASUALTY OFFICER/SENIOR HOUSE OFFICER (orthopædic) required for the above Hospital (Orthopædic Unit 74 Beds) in February. This Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) ORTHOPÆDIC HOUSE SURGEON required. Post recognised for Pre-registration Service and tenable for 6 months. The Hospital is the centre to which all trauma from a large industrial town and port is directed thus providing excellent experience in the treatment of traumatic conditions ; patients with orthopædic conditions are also drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Applications invited from local General Practitioners for appointment as CLINICAL ASSISTANTS. Appointments will be for a period of 1 year and will entail attendance at 1 session (normally 3½ hours per week) in any of the specialties mentioned below. Remuneration at rate of £175 p.a.

West Middlesex Hospital, Isleworth (4 posts). Details from Medical Director (Hounslow 2311).

Medicine—Sessions Monday or Friday mornings. Tuesday mornings (diabetics).

Surgery (Orthopædics)—Wednesday or Friday mornings. Monday or Tuesday afternoons.

Obstetrics and Gynæcology, Wednesday mornings.

Pædiatrics—Thursday afternoons.

King Edward Memorial Hospital, Ealing, W.13 (2 posts). Details from Hospital Secretary (Ealing 4081).

Medical Outpatient Clinic—Monday or Thursday mornings.

Applications, indicating specialty and day preferred, with personal particulars, qualifications and experience and the names of 2 referees, to the Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 7th February, 1956.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. The following resident House Officer posts become vacant on 1st March, 1956 :—

St. Helens Hospital (196 Beds)
HOUSE SURGEON.

Whiston Hospital, Prescot (892 Beds)
HOUSE SURGEON (orthopædic).

The above posts are recognised for Pre-registration Service.

Applications, stating age, date of qualification and experience and giving 2 names for reference, should be forwarded to the Secretary, Group Office, Whiston Hospital, Prescot, immediately. Please state for which position application is made.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) Locum Tenens ANÆSTHETIC REGISTRAR (resident), required at the above Hospital for period 3rd–31st March, 1956, inclusive. Recognised for D.A.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL. (384 Beds.) North West Metropolitan Regional Hospital Board. MEDICAL REGISTRAR (non-resident) required for 1 of 2 acute medical teams at above Hospital. Post suitable M.R.C.P. training. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, by 30th January, 1956.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds.) RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer status) required. Male or Female.

Applications, stating age, previous experience, and copies of 2 recent testimonials, to the Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts which are approved for pre-registration purposes :—

Stockport Infirmary (163 Beds)

HOUSE OFFICER (general surgery and ophthalmology). Recognised for the F.R.C.S. and D.O.M.S. Vacant 5th March, 1956.

HOUSE OFFICER (general surgery and gynæcology). Recognised for the F.R.C.S. Vacant 24th January, 1956.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Group Secretary, 59B, Shaw-heath, Stockport, Cheshire.

STOCKPORT INFIRMARY, Stockport. (163 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Assistant Resident Surgical Officer), general and orthopædics, vacant 12th March, 1956. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKTON-ON-TEES. SEDGEFIELD GENERAL HOSPITAL. (336 Beds.) SEDGEFIELD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery) required immediately. Post recognised in connection with F.R.C.S. examinations. Adequate staff employed. Excellent opportunities for study. Accommodation available for married couple, if desired. Further particulars gladly furnished on request.

Applications to the undersigned as soon as possible.

L. WATSON, Group Secretary.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (pædiatrics) required. Post vacant 14th February. Pre-registration. Hospital recognised for D.C.H.

Detailed applications, with copy testimonials, to Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. GYNÆCOLOGY DEPARTMENT. SENIOR HOUSE OFFICER required. Post vacant very shortly. Recognised for M.R.C.O.G. (surgery). Experience in abnormal obstetrics available, but the work is mainly gynæcological.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (orthopædics) required. Recognised pre-registration, vacant now.

Applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Post vacant early February. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general medicine with dermatology) required. Post vacant 31st January—pre-registration.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE. ROYAL INFIRMARY. HOUSE OFFICER (medical—dermatology) required. Recognised pre-registration.

Applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required ; pre-registration post.

Applications, stating age, qualifications with dates, with copies of 2 testimonials, to Hospital Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for the Unit of Obstetrics and Gynæcology. Post recognised for M.R.C.O.G. Preference given to candidates seeking pre-registration post.

Applications, stating age, experience and qualifications, with copies of 2 testimonials, to Hospital Secretary.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for 2 posts of HOUSE OFFICER (general surgery) which are now vacant. Applications are invited for both posts which are recognised for pre-registration candidates and also for the F.R.C.S.

Applications, stating age, nationality, and qualifications, together with the names of 2 referees, should be forwarded immediately to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TAUNTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (casualty and orthopædic). Post now vacant. Pre-registration appointment.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded immediately to the Group Secretary, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. Applications invited for position of SENIOR HOUSE OFFICER in the Thoracic Surgery Department. Salary £745 p.a. A charge of £155 p.a. is made for accommodation.

Address written applications, giving full personal particulars and details of experience, &c., together with 2 names and addresses for reference, to W. BOWRING, Group Secretary.

Victoria Chambers, Wood-street, Wakefield.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for the post of HOUSE SURGEON (Male or Female) recognised for pre-registration, at the above Hospital which will shortly become vacant. Salary will be £425–£525 p.a., less a deduction of £125 for full residential emoluments. The staffing of the Surgical Unit consists of a Senior Registrar, Registrar, and 2 House Surgeons. The post offers a comprehensive training in surgery.

Apply, giving full particulars, to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (198 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WATFORD. SHRODELLS HOSPITAL. Applications are invited for the post of HOUSE OFFICER (Senior House Officer grade) to the Pædiatric Unit of 38 Beds. Post recognised for the D.C.H. Vacant end of February.

Applications, together with 2 copies of recent testimonials, should reach the Medical Officer in charge as soon as possible.

WEAVERHAM, CHESHIRE. HEFFERSTON GRANGE SANATORIUM. (162 Beds.) RESIDENT SENIOR HOUSE OFFICER required. Salary £745 p.a., less £125 residential emoluments. Ministry of Health terms and conditions. Post offers experience in all forms of treatment of acute pulmonary tuberculosis.

Applications to the Secretary at the above address, with names of 2 referees, as soon as possible.

WEST BROMWICH AND DISTRICT GENERAL HOSPITAL. (144 Beds.) HOUSE SURGEON, vacant immediately. Pre-registration.

Applications, with 3 recent testimonials, to Group Secretary, West Bromwich and District Hospital Management Committee, Edward-street, West Bromwich.

WEST FIFE HOSPITALS BOARD OF MANAGEMENT. Applications are invited from suitably qualified medical practitioners (Male or Female), for the post of REGISTRAR (resident) at Glenlomond Hospital, By Kinross (140 Beds—respiratory and non-respiratory tuberculosis). The post is superannuable under the National Health Service superannuation regulations. Salary and conditions of service in accordance with national agreement.

Applications, giving full details of previous experience, should be lodged with the Physician-Superintendent, Glenlomond Hospital, by Kinross.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds. Pre-registration post.) HOUSE PHYSICIAN (first, second, or Senior House Officer post), vacant mid-March.

Detailed applications, with dates, and names of 2 referees, to Group Secretary, Workington Infirmary, Cumberland.

WINDSOR GROUP OF HOSPITALS. Senior House OFFICER required for Plastic Surgery based on King Edward VII Hospital, Windsor. Post vacant 1st April. Duties include care of hand injuries and accidents requiring plastic surgery. Plastic and accident services are closely associated and successful candidate will be given opportunity of gaining experience in general trauma.

Applications stating age, nationality, qualifications with dates, and experience with copies of 3 testimonials, to Hospital Secretary, by 5th February.

WOKING. ROWLEY BRISTOW ORTHOPÆDIC HOSPITAL, PYRFORD, WOKING, SURREY. (200 Beds.) Applications are invited for the posts of 2 RESIDENT HOUSE SURGEONS (Senior House Officer grade) vacant from 1st February. These posts are recognised for the F.R.C.S. examination and will include 1 session per week at St. Thomas's Hospital, London.

Applications should reach the Secretary within 14 days of the date of this advertisement.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the University of Birmingham Medical School.)

2 HOUSE OFFICERS (general surgery). 1 vacant now, 1 vacant 1st February. Pre-registration posts.

SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.

Apply, Secretary, with copies of testimonials.

WREXHAM. MAELOR GENERAL HOSPITAL. Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st February, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. Applications are invited from registered medical practitioners for the appointment of RESIDENT CASUALTY OFFICER (Senior House Officer grade), vacant February, 1956. The post is recognised for the revised Fellowship regulations in respect of the 6 months training required by candidates for the Final Fellowship examination.

Applications, stating age, qualifications, nationality and experience, together with copies of 2 recent testimonials, to be forwarded to the Hospital Secretary, as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

WATERFORD COUNTY SURGICAL HOSPITAL. (240 Beds.) Applications are invited for the following posts :—

(1) SURGICAL REGISTRAR. Salary £80(p.a., rising to £1000 by annual increments of £100. An additional allowance of £100 p.a. will be paid to holders of a higher degree in surgery. A deduction of £150 p.a. will be made for residential emoluments provided.

(2) SENIOR RESIDENT SUPGICAL OFFICER. Salary at the rate of £650 p.a., subject to a deduction of £150 p.a. in respect of full residential emoluments.

This is a general Hospital and offers experience in general surgery, medicines, orthopædics, ophthalmics, and maternity work.

Application forms are available from the undersigned, with whom completed forms should be lodged not later than 28th January, 1956.

J. A. HYNES, Secretary,
Waterford Board of Public Assistance.

Secretary's Office, Dungarvan, Ireland, 11th January, 1956.

U.S.A. CAMBRIDGE, MASSACHUSETTS. Applications are invited for the positions of approved RESIDENCIES in Anesthesia for a 2-year period beginning 1st July, and 1st September, 1956. Salary $1800 first year and $3600 second year, and full maintenance. Training in all branches of anesthesia. There is affiliation with other hospitals. Opportunity to attend various meetings in anesthesiology throughout the New England Area.

Applications, stating age, nationality, qualifications, and experience, together with the names of their referees, should be forwarded to the Director of Anesthesiology, P.O. Box 39, Cambridge 38, Massachusetts. Travelling expenses to and from the U.S.A. will be paid, but particulars will be sent as soon as application is received. Please enclose recent photograph with application.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
TODMORDEN ..	YORK .	4TH FEBRUARY, 1956

HERTFORDSHIRE COUNTY COUNCIL. Assistant COUNTY MEDICAL OFFICER, South-West or West Herts Division. Diploma in Public Health or Child Health desirable, but not essential. Salary £975–£50–£1375. Car necessary. Travelling and subsistence according to national scale.

Application forms and further particulars from County Medical Officer, County Hall, Hertford. Forms to be returned by 4th February.

GOVERNMENT OF INDIA. Applications are invited for the undermentioned posts in the All-India Institute of Medical Sciences, New Delhi, from candidates who fulfil the following conditions.

Applicants should be Indian citizens or persons who migrated from Pakistan with the intention of permanently settling in India. Upper age limit : 50 years relaxable in special cases by the Government of India.

(*a*) PROFESSORS AND HEADS OF DEPARTMENTS or the subjects of Anatomy, Physiology, Pharmacology, Pathology, Medicine, Surgery, Obstetrics and Gynæcology and Preventive and Social Medicine, Scale of pay : Rs. 1300–60–1600–100–1800. Compensatory allowance per month Rs. 400. Other allowances Rs. 150 as special allowance for duties as the Head of a Department.

(*b*) An Additional RESEARCH PROFESSOR in each of the Departments of Anatomy, Physiology, Pharmacology and Pathology. Scale of pay : Rs. 1300–60–1600–100–1800. Compensatory allowance per month Rs. 400.

(*c*) PROFESSORS in the Departments of Biochemistry, Bacteriology, Cardiology, Psychiatry, Skin and Venereal Diseases, Pædiatrics, Neurology, Chest Surgery, Neurosurgery, Genito-urinary Surgery, Plastic Surgery, Ophthalmology, Otorhinolaryngology, Maternal and Child Health, Forensic Medicine, Radiology and Anæsthesiology. Scale of pay : Rs. 1300–60–1600–100–1800. Compensatory allowance per month Rs. 400.

(*d*) ASSOCIATE PROFESSORS, 1 in each of the subjects of Biochemistry, Pathology and Bacteriology. Scale of pay : Rs. 800–40–1000–1000–1050–1050–1100–1100–1150–50–1300. Compensatory allowance per month Rs. 300.

(*e*) 2 ASSISTANT PROFESSORS in each of the Departments of Anatomy and Physiology and 1 ASSISTANT PROFESSOR in the Department of Biochemistry. Scale of pay : Rs. 500–25–650–30–800. Compensatory allowance per month Rs. 200.

(*f*) SUPERINTENDENT of the Hospital attached to the Medical Institute. Scale of pay : Rs. 1300–60–1600–100–1800. Compensatory allowance per month Rs. 300.

Private practice in any and every form is prohibited in respect of all the above posts.

Applications should reach the High Commission of India by 10th March, 1956.

Further details of individual posts and their essential requirements and copies of application forms may be had from the High Commission of India (Establishment Department), India House, Aldwych, London, W.C.2.

GOVERNMENT OF NORTHERN IRELAND. Civil SERVICE COMMISSION. Applications are invited for 2 posts of MEDICAL OFFICER in the Ministry of Health and Local Government. Subject to a probationary period of 2 years, the posts will be permanent and pensionable. Candidates must be registered medical practitioners, preferably of at least 10 years standing, with a wide experience of general practice and a sympathetic understanding of the problems of general practitioners working under the Health Services Scheme. Preference will be given to candidates who have also had experience in public health or hospital work. The salary scale (including pay supplement) is £1555 p.a., rising by annual increments to £2150. The minimum of the scale is linked to age 35 minus £50 for each year below that age ; and plus 1 increment for each year above that age, subject to a maximum entry point of £1950 (inclusive). Preference will be given to suitably qualified candidates who served in H.M. Forces during the 1914–18 or 1939–45 wars, provided the Commissioners are satisfied that such candidates are, or within a reasonable time will be, able to discharge the duties efficiently.

Application forms and further particulars may be obtained from the Secretary, Civil Service Commission, Stormont, Belfast ; completed application forms, together with copies of 2 recent testimonials, must be returned so as to reach the Secretary not later than 6th February, 1956.

NATIONAL COAL BOARD. North-Eastern Division. Applications are invited for the post of ASSISTANT AREA MEDICAL OFFICER in No. 2 (Doncaster) Area. Candidates should preferably be aged about 30 years and have experience in the field of preventive and industrial medicine and a knowledge of the Coal Mining Industry would be an advantage. The work will include making underground visits at collieries. Salary according to qualifications and experience will be within the range of £1100–£1600 p.a. Candidates with a fair amount of postgraduate experience will not be paid less than £1200.

Detailed applications, giving the names of 2 referees, should be sent to the Staff Director, National Coal Board, North-Eastern Division, Ranmoor Hall, Belgrave-road, Sheffield, 10, to arrive not later than 4th February, 1956.

NORTHAMPTONSHIRE COUNTY COUNCIL. Applications are invited for the whole-time appointment of ASSISTANT MEDICAL OFFICER for Maternity and Child Welfare and School Medical Inspection on the salary scale of £975–£50–£1375 p.a. Travelling and subsistence allowances will be paid on the scale from time to time approved by the Council. Candidates should possess special knowledge of, and experience in, maternity and child welfare work and preference will be given to those who hold the Diploma in Child Health and have been approved by the Minister of Education for the examination and ascertainment of educationally subnormal pupils. The Officer appointed will work under the direction of the County Medical Officer of Health and will be required to reside in or near Kettering. The appointment will be subject to the Local Government superannuation acts and will be determinable by 3 months notice on either side.

Applications, stating age, qualifications and experience, with the names of 2 referees, should reach the undersigned not later than 11th February, 1956.

J. ALAN TURNER, Clerk of the County Council.
County Hall, Northampton, 6th January, 1956.

NOTTINGHAMSHIRE COUNTY COUNCIL. Hucknall URBAN DISTRICT COUNCIL. Mixed appointment. Applications are invited from registered medical practitioners for the mixed whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH to the Hucknall Urban District. Applicants must have had at least 3 years professional experience since qualifying, be experienced in the duties of Medical Officer of Health, School Medical Officer, and the care of mothers and young children, and possess a Diploma in Public Health.

Salaries are in accordance with awards 2285, 2321, 2452, and 2565 of the Industrial Court for Public Health Medical Officers holding mixed appointments, namely :—

(*a*) Assistant County Medical Officers (32/44ths) £894 17s. 9d.–£39 15s. 5d.–£1093 15s. 0d. (on scale £1125–£50–£1375, plus loading in accordance with Spens Formula).

(*b*) Medical Officer of Health (12/44ths) £484 8s. 8d.–£14 6s. 4d.–£541 14s. 0d. (on scale £1676 5s. 0d.–£52 10s. 0d.–£1886 5s. 0d., plus 12/44ths of £100).

Application forms and conditions of appointment are obtainable from my office and applications should reach me by 18th February, 1956. Canvassing disqualifies.

A. R. DAVIS, Clerk of the County Council.
Shire Hall, Nottingham.

THE LONDON COUNTY COUNCIL invites applications from registered medical practitioners, practising in the locality, for appointment as VISITING MEDICAL OFFICER to Stamford House Remand Home, 206A, Goldhawk-road, W.12. Remuneration : £275 a year, exclusive of any fees receivable from the London Executive Council in respect of Residents or staff.

Further details including duties and application forms, obtainable from the Medical Officer of Health (PH/D1/70), County Hall, Westminster Bridge, S.E.1, and should be returned by 6th February.

WORCESTERSHIRE COUNTY COUNCIL. Deputy MEDICAL OFFICER OF HEALTH, Borough of Oldbury, AND DEPUTY DIVISIONAL MEDICAL OFFICER OF HEALTH, Oldbury. Applications invited from registered medical practitioners with D.P.H. Salary £1115 16s. 8d.–£1497 1s. 8d. (Deputy Divisional Medical Officer's post on scale £732 10s.–£37 10s. (7)–£48 15s.–£1043 15s., and Deputy Medical Officer of Health post on scale £383 6s. 8d.–£17 10s. (4)–£453 6s. 8d.).

Application forms obtainable from County Medical Officer, County Buildings, Worcester, to be returned by 31st January, 1956 (F.223).

LANCASHIRE COUNTY COUNCIL. **Applications invited** from registered medical practitioners for appointment of ASSISTANT DIVISIONAL MEDICAL OFFICERS in the Boroughs of Heywood and Leigh, near Manchester, and areas adjacent to Oldham. Possession of D.P.H. desirable. Salary £975–£1375 p.a. Travelling and subsistence allowances where applicable.

Application forms and further particulars from County Medical Officer, Serial 467, East Cliff County Offices, Preston.

STAFFORDSHIRE COUNTY COUNCIL. **Applications** are invited from fully qualified medical practitioners for the appointment of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER, the main duty of which will be the administration of dental anæsthetics, so that previous experience in that connection will be an advantage. Other duties will be prescribed by the County Medical Officer of Health as and when required. The salary scale is £975–£50–£1375, and previous Local Authority service may be taken into consideration when deciding the commencing rate. The use of a car will be necessary and allowances will be paid in accordance with the County Council scale. The appointment will be terminable by 3 months notice in writing on either side and superannuable, and the selected candidate will be required to pass a medical examination and produce his or her birth certificate.

Forms of application and further information can be obtained from the County Medical Officer of Health, County Buildings, Stafford, to whom applications should be sent by not later than 4th February, 1956.

T. H. EVANS, Clerk of the County Council.

County Buildings, Stafford, 5th January, 1956.

SUDAN GOVERNMENT. **The Ministry of Health, Sudan** Government, invites applications for the following posts :—

MEDICAL PATHOLOGIST. Candidates must have Honours Degree and be fully literate in either Arabic or English. Age 22–45 years. Salary range from £E.1750 to £E.2330 p.a. (for Junior Specialist) or a fixed salary of £E.2500 p.a. (for Specialist).

BACTERIOLOGIST. Candidates should have specialist experience in bacteriology, and in a reputed Institute. Salary range from £E.1750 to £E.2330 p.a. (for Junior Specialist) or a fixed salary of £E.2500 p.a. (for Specialist).

Candidates for these posts may apply for secondment from the National Health Service for a period of up to 3 years under the terms of circular letter No. NHB/(52) 106EG/(52)101 of 30th September, 1952.

The above appointments will be on short-term contracts for a period of up to 3 years and starting rates of pay will be determined according to age, experience and qualifications. In certain cases a cost-of-living allowance is also payable at present. A bonus of 1 months salary for each year of service, subject to a maximum of 6 months pay is payable on satisfactory completion of the contract. Outfit allowance of £E.50 is payable when the contract is signed. Free passage on appointment. Annual leave after the first tour.

Further particulars and application form will be sent on application to Dr. E. P. PRATT, Consulting-Physician to the Sudan Government, 137, Harley-street, London, W.1. Please quote the appointment concerned and give name and address in block letters.

YORKSHIRE. COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE. Applications are invited from registered medical practitioners, Men or Women, for the post of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER in the Todmorden area of the County. The Assistant will be on the staff of the County Medical Officer's Department but will work under the administrative direction of the Divisional Medical Officer for the area. The duties will be mainly clinical in the School Health and Infant Welfare Services, but other health duties may be included by the Divisional Medical Officer. The scale of salary is £975 p.a., rising by annual increments of £50 to £1375 p.a. A minimum of 3 years experience since qualification is desirable and the possession of a Diploma in Child Health will be an advantage. Travelling and subsistence allowances according to the County Council's scale are payable in addition to salary. The post is superannuable and the successful applicant will be required to pass a medical examination as to physical fitness.

Forms of application can be obtained from the undersigned, to whom they should be returned not later than 4th February, 1956. J. WOOD-WILSON, County Medical Officer.

County Hall, Wakefield.

General Practice

or an Executive Council post (England and Wales) apply on form E.C.16A *obtainable from the council. Mark envelope "Vacancy"*

SALE, CHESHIRE. **Applications are invited for death** VACANCY. The practice is in a residential area adjoining Manchester—classification is "Intermediate." Residence and professional accommodation is understood to be available for purchase. List approximately 1100. Apply on Form E.C.16A not later than 4th February, 1956, to the Clerk, Cheshire Executive Council, 28, Nicholas-street, Chester.

Hospital Services : Non-Medical Appointments

HEREFORD. COUNTY HOSPITAL. **(335 Beds.) Senior** TECHNICIAN OR TECHNICIAN with general hospital laboratory experience wanted immediately. Special experience in hæmatology an advantage. Applicants should possess the A.I.M.L.T. or F.I.M.L.T.

Applications, together with the names of 2 referees to be sent to the Consultant Pathologist.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTHLANDS HOSPITAL, SHOREHAM-BY-SEA. Applications are invited for the appointment of SENIOR PHARMACIST. Salary as Pharmaceutical Whitley Council scale.

Applications, stating age, qualifications and experience, to be sent to the Hospital Secretary.

A. V. OAKTON, Group Secretary.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 *applies*

The International Labour Office invites applications from men and women of up to about 40 years for a post of Member of Division in the Occupational Safety and Health Division of the International Labour Office, Geneva, Switzerland. Qualifications required : (1) Languages : English ; sufficient knowledge of French for the purposes of revision of technical translations from French into English; knowledge of other languages, especially German and Spanish, an advantage, (2) A recognised medical degree, (3) Specialisation in occupational health with at least 3 years practical activity in this field.

For further particulars and application forms apply, enclosing stamped addressed foolscap envelope, to the International Labour Office, 38/39, Parliament-street, London, S.W.1. The closing date for the receipt in this Office of completed application forms is 15th February, 1956.

Catholic Mission Hospital, Nigeria. **2 Doctors needed** urgently, 1 for acute general hospital, 1 for leper colony.—For details apply : Secretary, DAMIEN MEDICO-MISSIONARY SOCIETY, 31, Fitzwilliam-square, Dublin.

British Council requires Junior Editorial Assistant for *British Medical Bulletin*. Experience in medical library, or secretarial or editorial experience in medical school or on medical or scientific journal, essential. Inclusive starting salary up to £423 (men) or £385 (women) at age 25 or over, rising on present scales to £625 (men), also by stages towards equal pay for women. Typing allowance up to £32 a year if qualified. 5-day week. Pension scheme.

Write, quoting "Medical," and enclosing stamped addressed foolscap envelope to Director, Personnel Department, 65, Davies-street, W.1, for further particulars and application form to be returned completed by 3rd February, 1956.

Marks and Spencer Limited invite applications for the post of Senior Assistant (Female) eventually to become Deputy, to the Chief Medical Officer. The additional qualification of D.P.H. or D.I.H. is desirable, but not essential. Salary according to B.M.A. scale.—Applications by letter stating age, qualifications with dates, and experience, to the Secretary, Medical Selection Committee, Marks and Spencer Limited, 82, Baker-street, London, W.1.

Assistant with prospects wanted by elderly Doctor, moderate practice. Healthy part London.—Address, No. 198, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Secretary required by Medical Unit. **Previous medical** experience desirable but not essential. Salary according to age and experience.—Applications to : The Secretary, Medical Unit, Middlesex Hospital, London, W.1.

Medical Publisher requires experienced Secretary from 2 to 5.30 P.M. Monday–Friday.—Phone : LANgham 4255.

Part-time Consulting-rooms to let in the Harley-street district. Rents from £60 per half-day session or with plate £75 p.a.—Apply : ELLIOTT, SON & BOYTON, 86/87, Wimpole-street, London, W.1 (WELbeck 8367).

Offers are invited for the undermentioned X-ray equipment which will shortly be available for disposal. This equipment may be viewed, if necessary, at the Poole General Hospital :—

1 Watson R500 hand-tilting x-ray table complete with screen and Potter Bucky diaphragm (without x-ray tubes).

1 tube column for R500 table (without x-ray tubes).

This equipment was manufactured in 1947.

Offers should be forwarded to The Group Secretary, Bournemouth and East Dorset Hospital Management Committee, Hospital Management Committee Office, Royal Victoria Hospital, Gloucester-road, Boscombe.

Typewriting and Duplicating. **First-class work at moderate** prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

Inventors or Designers of medical equipment. **Established** manufacturers, contractors to Ministry of Health, desire to extend their present range of products. We shall be pleased to investigate details of new or improved equipment (other than instruments) with a view to manufacturing and marketing same. All details received will be treated as strictly confidential.—Address, No. 187, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Microscopes. **Highest prices paid for good modern types.** Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

Gnomist. **Doctors, for Night and Day driving.** **Wind-screens and back windows.** Perfect Demister. Needs no cleaning. 1 application only. Sizes 2s. 6d.–3s. 6d.–4s. 6d. per sheet.—Apply : GNOMIST CO., 108, Clarendon-road, W.11 (Phone : PARk 4487).

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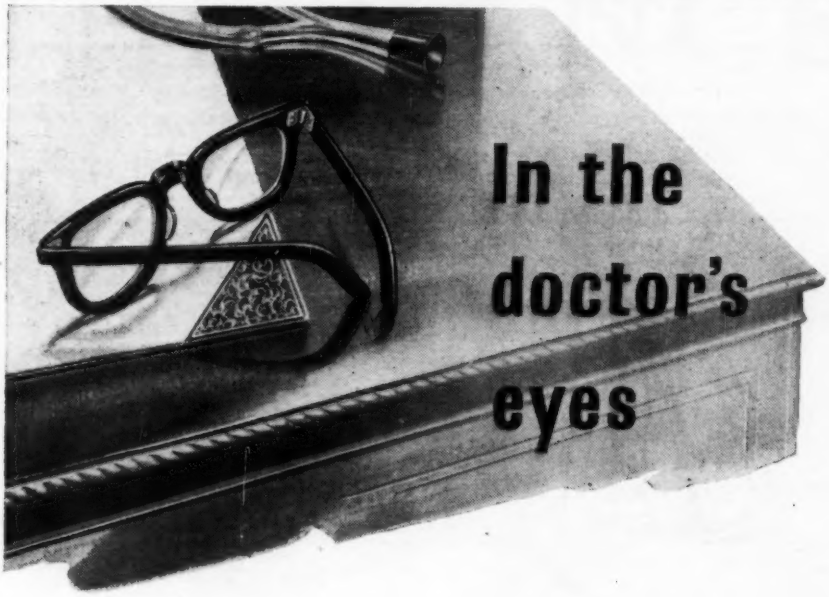

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